MITSUBISHI ELECTRIC

AIR CONDITIONERS CITY MULTI Series Y

Models **PUHY-80TMU-A, 100TMU-A**

Service Handbook

CITY MULTI

Safety precautions

Before installation and electric work

- **Before installing the unit, make sure you read all the "Safety precautions".**
- **The "Safety precautions" provide very important points regarding safety. Make sure you follow them.**
- **This equipment may have an adverse effect on equipment on the same electrical supply system.**
- **Please report to or take consent by the supply authority before connection to the system.**

Symbols used in the text

⚠ Warning:
Describes precautions that should be observed to prevent danger of injury or death to the user.

⚠ Caution:
Describes precautions that should be observed to prevent damage to the unit.

Symbols used in the illustrations

: Indicates an action that must be avoided.

: Indicates that important instructions must be followed.

: Indicates a part which must be grounded.

: Indicates that caution should be taken with rotating parts. (This symbol is displayed on the main unit label.) <Color: Yellow>

: Indicates that the main switch must be turned off before servicing. (This symbol is displayed on the main unit label.) <Color: Blue>

: Beware of electric shock (This symbol is displayed on the main unit label.) <Color: Yellow>

: Beware of hot surface (This symbol is displayed on the main unit label.) <Color: Yellow>

ELV : Please pay attention to electric shock because this is not Safety Extra Low-Voltage (SELV) circuit. And at servicing, please shut down the power supply for both Indoor Unit and Outdoor Unit .

⚠ Warning:
Carefully read the labels affixed to the main unit.

⚠ Warning:

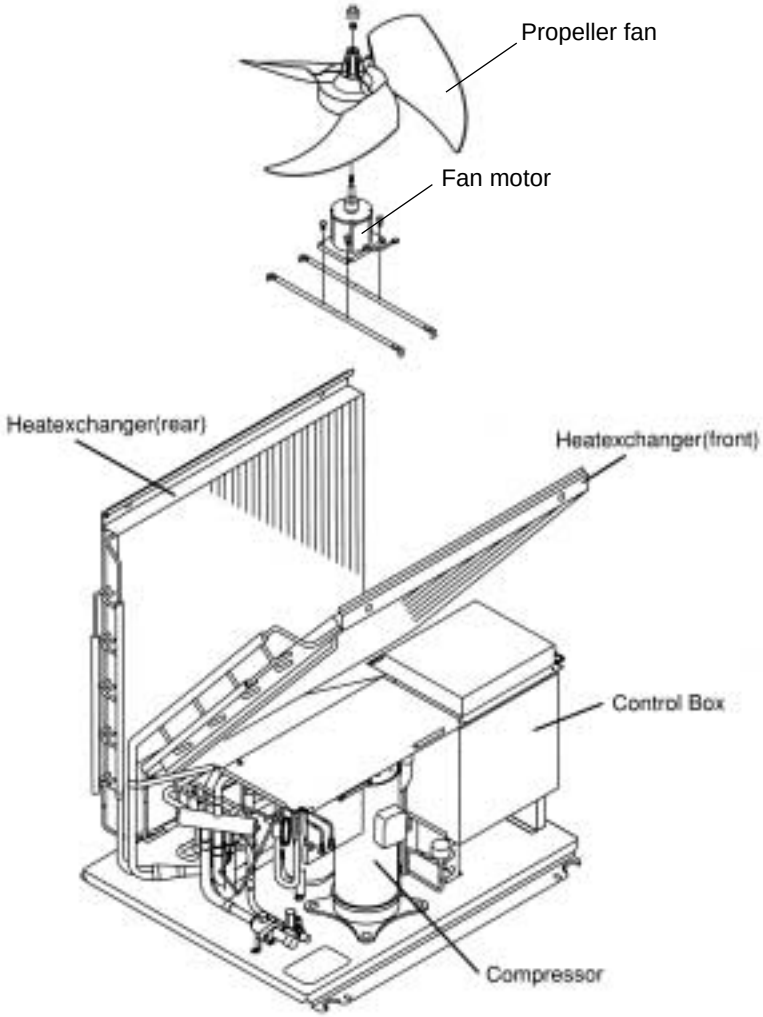
- **Ask the dealer or an authorized technician to install the air conditioner.**
  - Improper installation by the user may result in water leakage, electric shock, or fire.
- **Install the air unit at a place that can withstand its weight.**
  - Inadequate strength may cause the unit to fall down, resulting in injuries.
- **Use the specified cables for wiring. Make the connections securely so that the outside force of the cable is not applied to the terminals.**
  - Inadequate connection and fastening may generate heat and cause a fire.
- **Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.**
  - Improper installation may cause the unit to topple and result in injury.
- **Always use an air cleaner, humidifier, electric heater, and other accessories specified by Mitsubishi Electric.**
  - Ask an authorized technician to install the accessories. Improper installation by the user may result in water leakage, electric shock, or fire.
- **Never repair the unit. If the air conditioner must be repaired, consult the dealer.**
  - If the unit is repaired improperly, water leakage, electric shock, or fire may result.
- **Do not touch the heat exchanger fins.**
  - Improper handling may result in injury.
- **If refrigerant gas leaks during installation work, ventilate the room.**
  - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- **Install the air conditioner according to this Installation Manual.**
  - If the unit is installed improperly, water leakage, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations"and the instructions given in this manual and always use a special circuit.**
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Securely install the cover of control box and the panel.**
  - If the cover and panel are not installed properly, dust or water may enter the outdoor unit and fire or electric shock may result.
- **When installing and moving the air conditioner to another site, do not charge it with a refrigerant different from the refrigerant (R22) specified on the unit.**
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
  - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air conditioner, consult the dealer or an authorized technician.**
  - If the air conditioner is installed improperly, water leakage, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
  - If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.

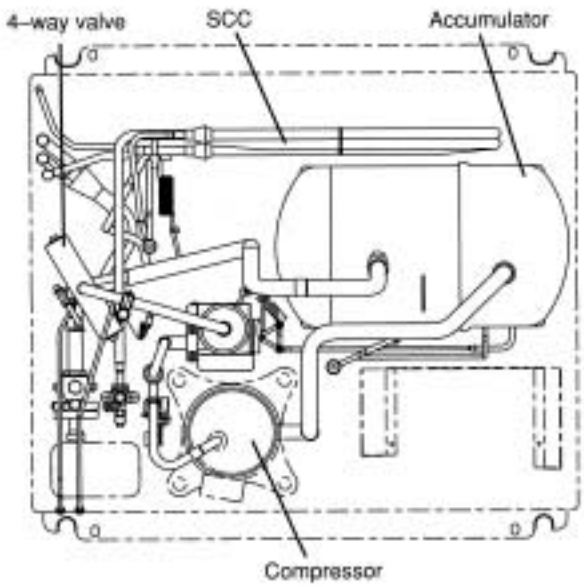
Contents

1 COMPONENT OF EQUIPMENT

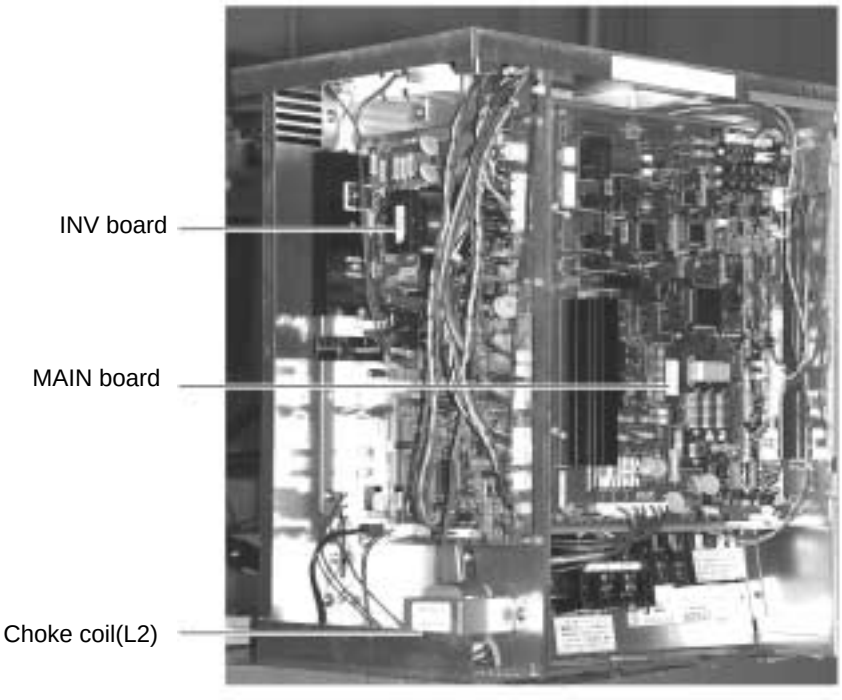
[1] Appearance of Components

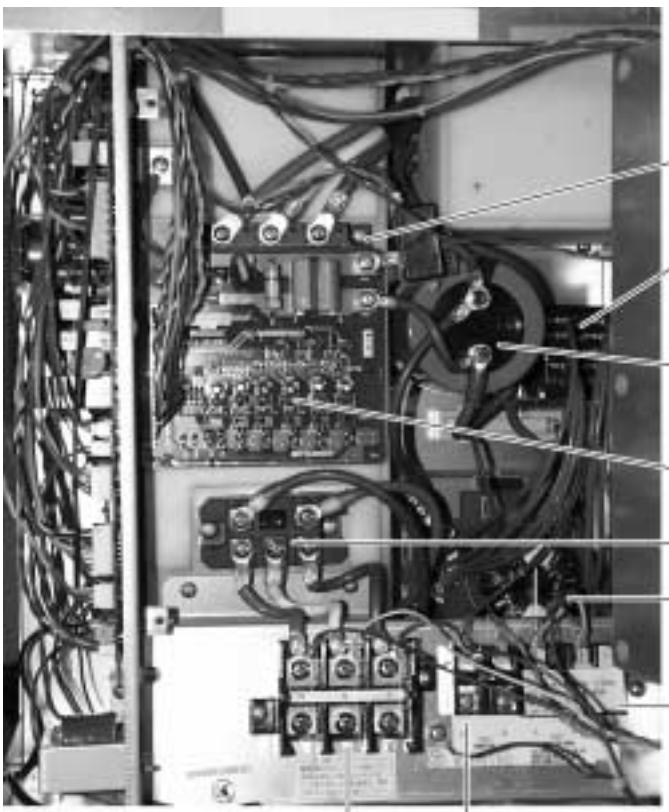
① Outdoor unit



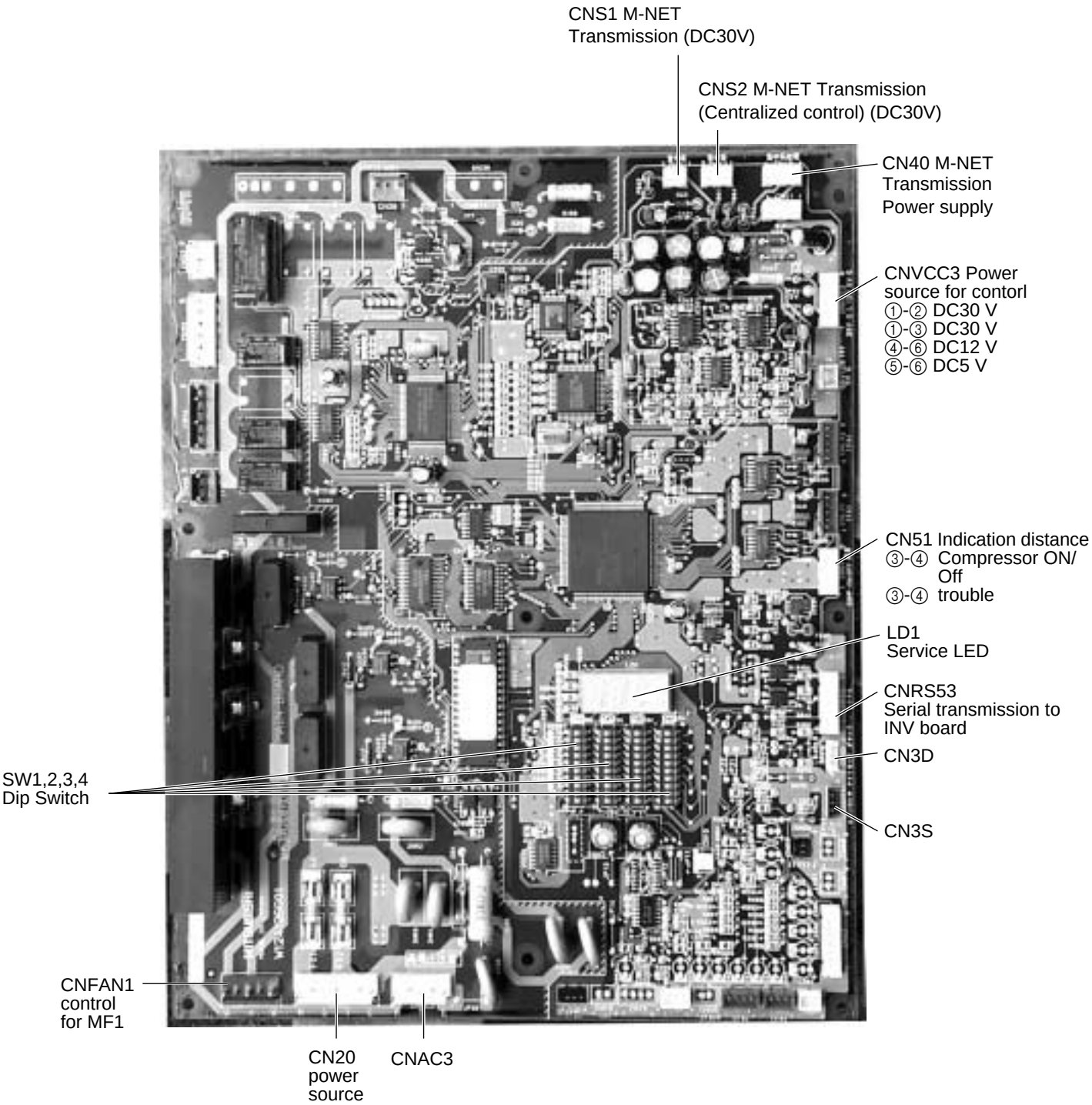


Rear Controller Box

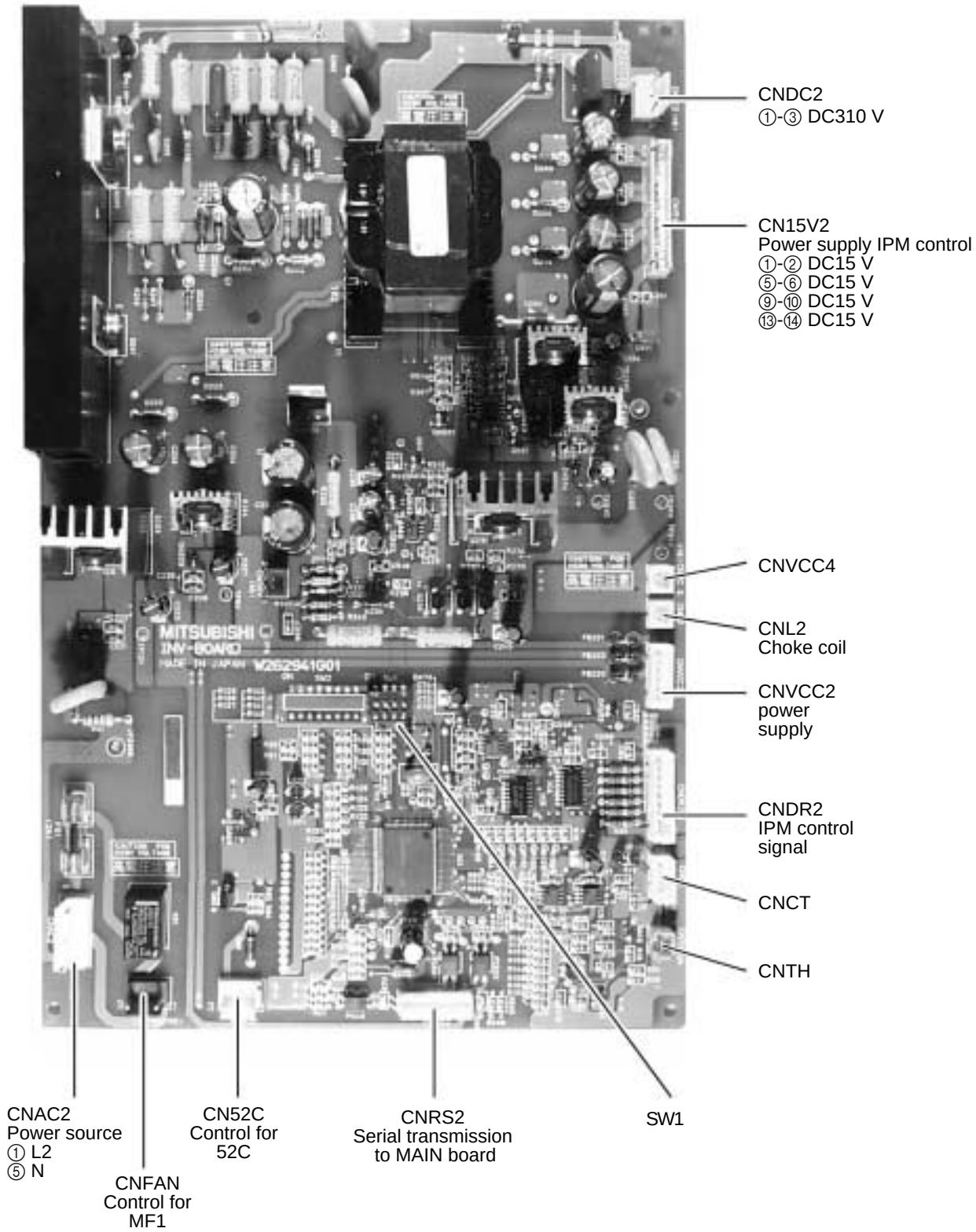




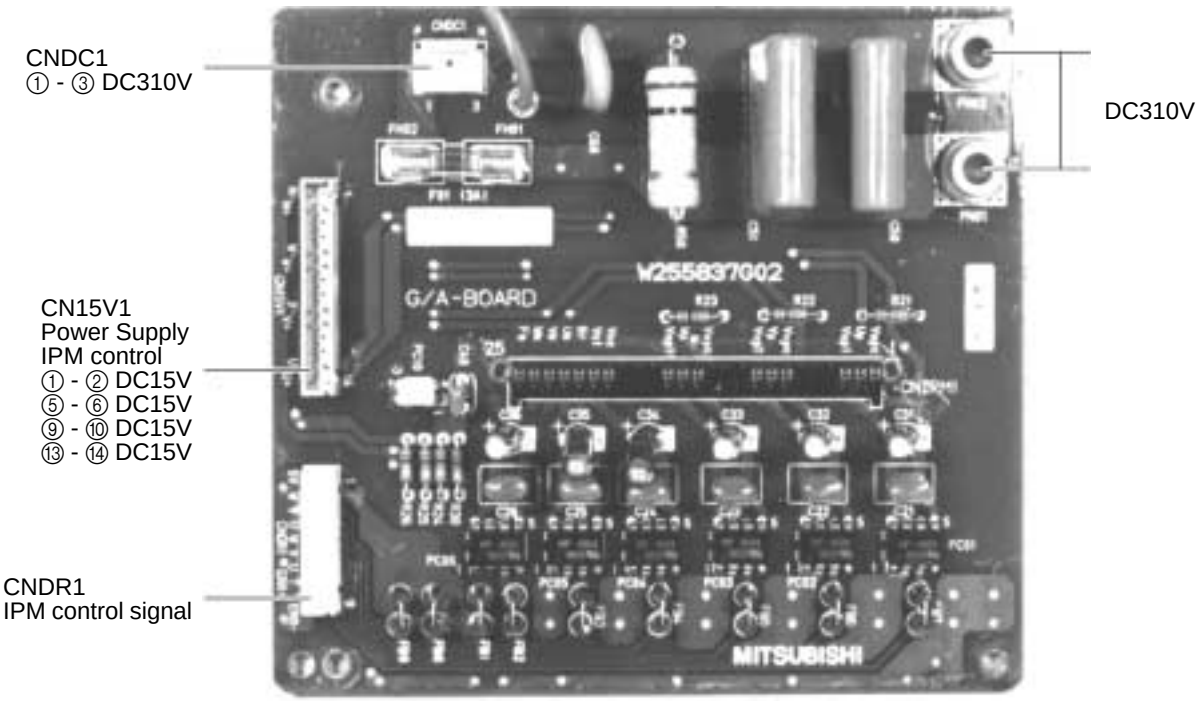
MAIN board


CNS1 M-NET
Transmission (DC30V)
CNS2 M-NET Transmission
(Centralized control) (DC30V)
CN40 M-NET
Transmission
Power supply
CNVCC3 Power
source for contorl
①-② DC30 V
①-③ DC30 V
④-⑥ DC12 V
⑤-⑥ DC5 V
CN51 Indication distance
③-④ Compressor ON/
Off
③-④ trouble
LD1
Service LED
CNRS53
Serial transmission to
INV board
CN3D
CN3S
SW1,2,3,4
Dip Switch
CNFAN1
control
for MF1
CN20
power
source
CNAC3

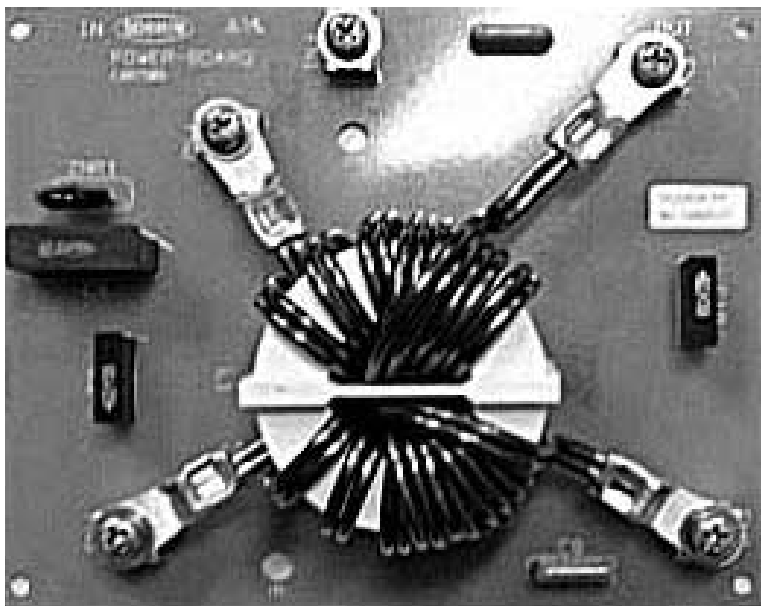
INV board


CNDC2
①-③ DC310 V
CN15V2
Power supply IPM control
①-② DC15 V
⑤-⑥ DC15 V
⑨-⑩ DC15 V
⑬-⑭ DC15 V
CNVCC4
CNL2
Choke coil
CNVCC2
power
supply
CNDR2
IPM control
signal
CNCT
CNTH
CNAC2
Power source
① L2
⑤ N
CNFAN
Control for
MF1
CN52C
Control for
52C
CNRS2
Serial transmission
to MAIN board
SW1
MITSUBISHI
INV-BOARD
W262941G01

G/A board

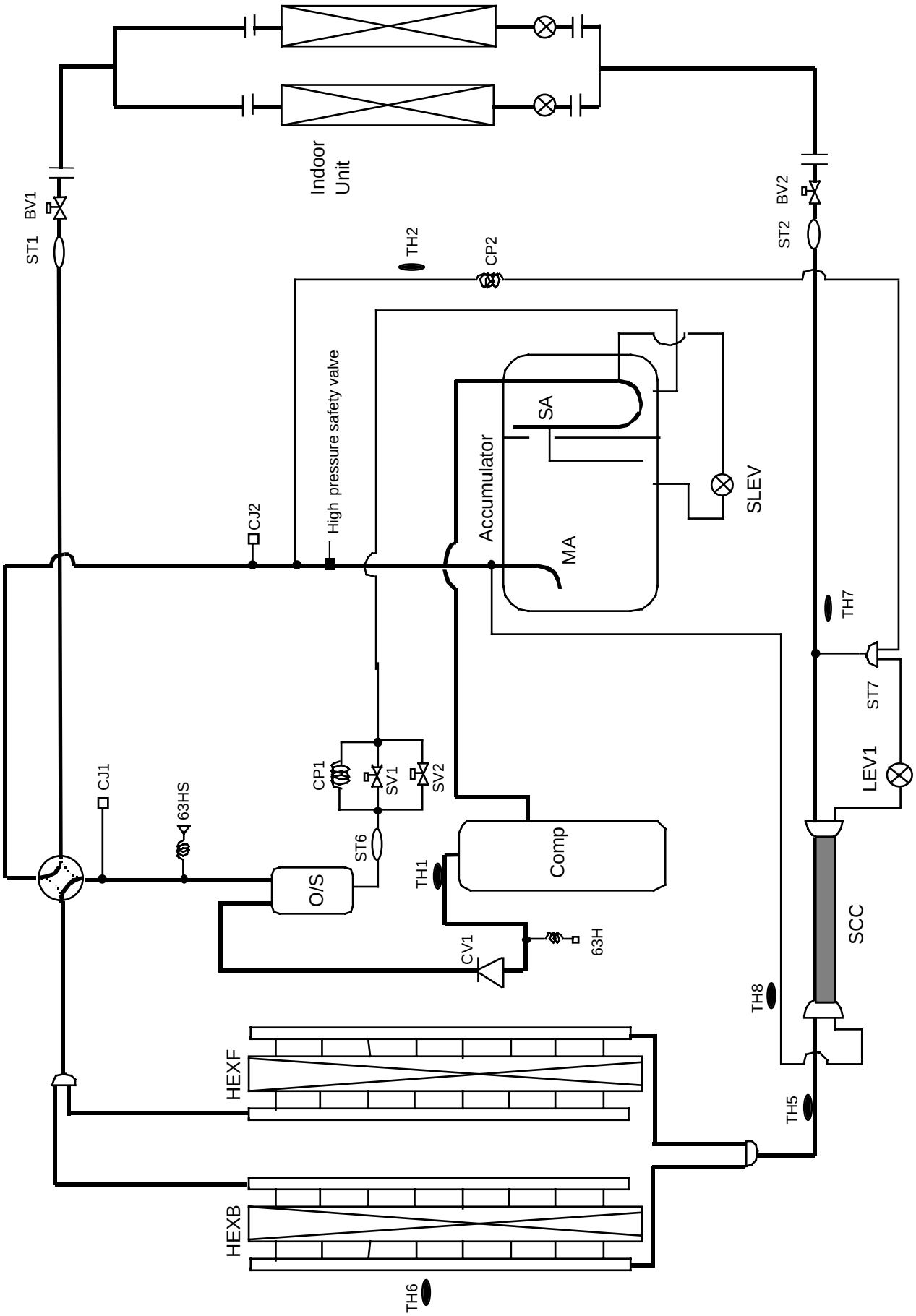


Power board

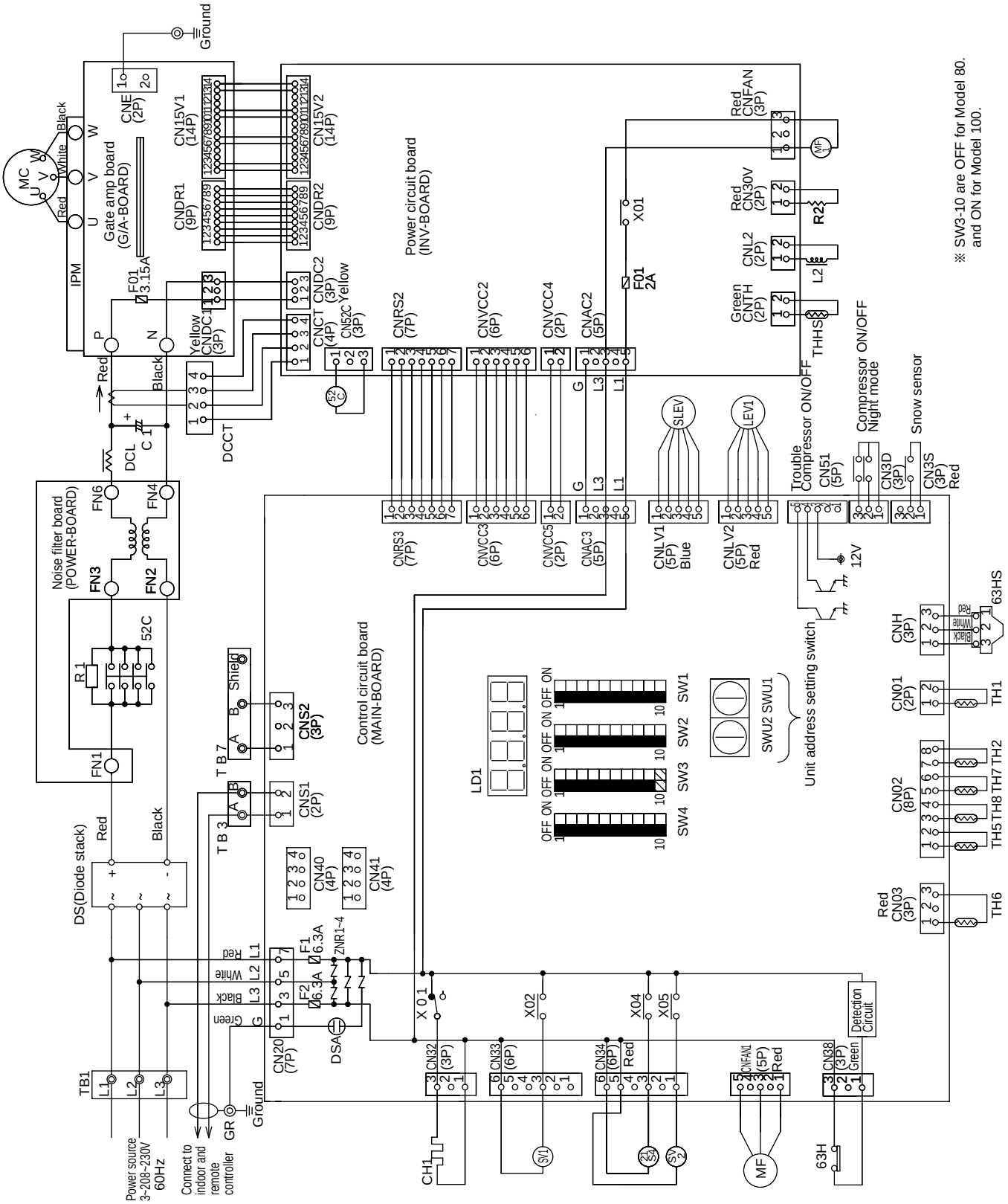


[2] Refirigerant Circuit Diagram and Thermal Sensor

① PUHY-80TMU-A, 100TMU-A



[3] PUHY-80, 100TMU-A ELECTRICAL WIRING DIAGRAM

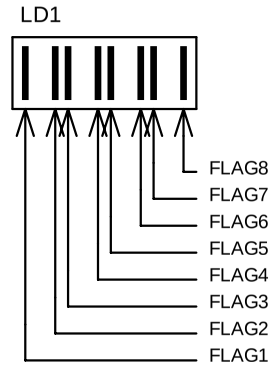


Symbol	Name	Symbol	Name	Symbol	Name		Symbol	Name
D S	Diode stack	M F	Motor Fan Heat exchanger	T H 6	Thermistor	OA temp.detect	L D 1	Luminous diode
I P M	Intelligent Power Module	M F 1	Motor Fan Radiator panel	T H 7		liquid outlet temp. detect at Sub-cool coil	S W 1	Switch display selection self-diagnosis
D C L	DC reactor (Power factor improvement)	D S A	Surge absorber				S W 2 ~4	Switch function selection
		C H 1	Crankcase heater (Compressor)	T H 8		bypass outlet temp. detect at Sub-cool coil	S W U 1 ~ 2	Switch unit address set
D C C T	Current Sensor	2 1 S 4	4-way valve				T B 1	Terminal block power source
R 1	Resistor rush current protect	S V 1 , S V 2	Solenoid valve (Discharge-suction bypass)	T H H S	Rediator panel temp.detect		T B 3	Terminal block transmisson
R 2	Resistor power regulation			6 3 H S	High pressure sensor		T B 7	Terminal block transmisson centralized control
Z N R 1 ~ 4	Varistor	6 3 H	High pressure switch	S L E V	Electronic expansion valve (Oil return)			
C 1	Capacitor Smoothing	T H 1	Thermistor discharge pipe temp.detect				GR	Ground terminal
5 2 C	Magnetic contactor (Inverter main circuit)	T H 2	saturation evapo.temp.detect	L E V 1	Electronic expansion valve (Sub-cool coil bypass)			
M C	Motor Compressor	T H 5	pipe temp.detect	L 2	Choke coil(Transmission)			

<Operation of self-diagnosis switch (SW1) and LED display>

Display		Display at LED lighting (blinking) Remarks SW1 operation								
		FLAG1	FLAG2	FLAG3	FLAG4	FLAG5	FLAG6	FLAG7	FLAG8	
ON : 1 OFF : 0 1 2 3 4 5 6 7 8 9 10 (at factory shipment)	Relay output display (Lighting)	During compressor run	Crankcase heater	21S4	SV1	SV2			Always lighting	FLAG8 always lights at microcomputer power ON
	Check display (Blinking)	0000~9999 Display the address and error codes by turns								

<LED display>



[4] Standard operation data

① Cooling operation

Items \ Outdoor units				PUHY-80TMU-A				PUHY-100TMU-A			
Condition	Ambient temp.	Indoor	DB/WB	26.7°C(80°F)/19.4°C(67°F)							
		Outdoor		35°C(95°F)							
	Indoor unit	Quantity	Set	4				4			
		Quantity in operation		4				4			
		Model	–	24	24	20	10	48	16	24	10
	Piping	Main pipe	m (Ft)	5(16.4)				5(16.4)			
		Branch pipe		5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)
		Total piping length		25(82)				25(82)			
	Indoor unit fan notch		–	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi
	Refrigerant volume		kg(oz)	10.2(360)				12.5(441)			
Compressor volts/Frequency			V	208		230		208		230	
			V/Hz	134/76		134/76		171/98		171/98	
Outdoor unit			A	27.4		24.8		35.2		31.8	
LEV opening	Indoor unit		Pulse	440	440	380	300	450	320	440	300
	SC (LEV1)			75				81			
	Oil return (SLEV)			111				157			
Pressure	High pressure/Low pressure (after O/S) (before MA)		MPa(psi)	2.00/0.50 (290/72)				1.99/0.46 (288/67)			
Sectional temperature	Outdoor unit	Discharge (TH1)	°C (°F)	85(185)				95(203)			
		Heat exchanger outlet (TH5)		40(104)				42(108)			
		Accumulator Inlet		7(45)				5(41)			
		Accumulator Outlet		9(48)				7(45)			
		Suction (Comp)		7(45)				10(50)			
		low pressure saturation temperature (TH2)		6(43)				4(39)			
		Shell bottom (Comp)		60(140)				60(140)			
		SCC outlet (TH7)		27(81)				27(81)			
		Bypass outlet (TH8)		8(46)				6(43)			
	Indoor unit	LEV inlet		26(79)				26(79)			
		Heat exchanger outlet		10(50)				10(50)			

② Heating operation

Items \ Outdoor units				PUHY-200TM-A				PUHY-250TM-A			
Condition	Ambient temp.	Indoor	DB/WB	21.1°C(70°F)							
		Outdoor		8.3°C(47°F)/6.1°C(43°F)							
	Indoor unit	Quantity	Set	4				4			
		Quantity in operation		4				4			
		Model	–	24	24	20	10	48	16	24	10
	Piping	Main pipe	m	5(16.4)				5(16.4)			
		Branch pipe		5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)	5(16.4)
		Total piping length		25(82)				25(82)			
	Indoor unit fan notch		–	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi
	Refrigerant volume		kg	10.2(360)				12.5(441)			
Compressor volts/Frequency			V	208		230		208		230	
			V/Hz	149/85		149/85		174/100		174/100	
Outdoor unit			A	27.5		24.9		35.6		32.2	
LEV opening	Indoor unit		Pulse	510	510	450	300	350	380	510	300
	SC (LEV1)			0				0			
	Oil return (SLEV)			87				111			
Pressure	High pressure/Low pressure (after O/S) (before MA)		MPa(psi)	1.72/0.36 (249/52)				1.72/0.36 (249/52)			
Sectional temperature	Outdoor unit	Discharge (TH1)	°C (°F)	80				85(185)			
		Heat exchanger inlet (TH5)		6(46)				8(46)			
		Accumulator Inlet		–1(30)				–2(28)			
		Accumulator Outlet		–1(30)				–2(28)			
		Suction (Comp)		–1(30)				–2(28)			
		low pressure saturation temperature (TH2)		–2(28)				–2(28)			
		Shell bottom (Comp)		35(95)				44(111)			
	Indoor unit	Heat exchanger inlet		71(160)				71(160)			
		LEV inlet		33(91)				33(91)			

[5] Function of dip SW and rotary SW

(1) Outdoor unit

Switch		Function	Function According to Switch Operation		Switch Set Timing	
			When Off	When On	When Off	When On
SWU	1~2	Unit Address Setting	Set on 00 or 51~100 with the dial switch. (*2)		Before power is turned on.	
SW1	1~8	For self diagnosis/ operation monitoring	LED Monitering Display		During normal operation when power is on.	
	9~10	–	–	–	Should be set on OFF.	
SW2	1	Centralized Control Switch	Centralized control not connected.	Centralized control connected.	Before power is turned on.	
	2	Deletion of connection information.	Storing of refrigeration system connection information.	Deletion of refrigeration system connection information.	Before power is turned on.	
	3	Deletion of error history.	–	Deletion	During normal operation when power is on.	
	4	Adjustment of Refrigerant Volume	Ordinary control	Refrigerant volume adjustment operation.	During normal operation when power is on.	Invalid 2 hours after compressor starts.
	5	–	–	–	–	
	6	Disregard ambient air sensor errors, fluid overflow errors.	Errors valid.	Disregard errors.	During normal operation when power is on.	
	7	Forced defrosting	Ordinary control	Start forced defrosting.	During normal operation when power is on.	10 minutes or more after compressor starts.
	8	Defrost prohibited timer	50 min.	90 min.	During normal operation when power is on. (Except during defrosting)	
	9	–	–	–	–	
	10	–	–	–	–	
SW3	1	SW3-2 Function Valid/ Invalid	SW3-2 Function Invalid	SW3-2 Function Valid	During normal operation when power is on.	
	2	Indoor Unit Test Operation	Stop all indoor units.	All indoor units test operation ON.	When SW3-1 is ON after power is turned on.	
	3	Defrosting start temperature of TH5.	-2°C (28.4°F)	0°C (32°F)	During normal operation when power is on.	
	4	Defrosting end temperature of TH5.	8HP: 12°C(53.6°F) 10HP: 8°C(46.4°F)	15°C (59°F)	During normal operation when power is on. (Except during defrosting)	
		Opening angle of IC except when heater thermostat is ON during defrosting.	(no operation)	2000		
	5	–	–	–	–	
	6	–	–	–	When switching on the power.	
	7	Target Pd (High pressure)	18kg/cm²G (256psi)	20kg/cm²G (284psi)	During normal operation when power is on.	
	8	–	–	–	–	
	9	–	–	–	–	
	10	Models	Model 80	Model 100	When switching on the power.	
SW4	1	–	–	–	–	
	2	–	–	–	–	
	3	–	–	–	–	
	4	–	–	–	–	
	5	LED Display	"°F" "psig" Display	"°C" "kgf/cmG "Display	When switching on the power	
	6	–	–	–	–	
	7	–	–	–	–	
	8	–	–	–	–	
	9	Fan characteristics ( )	Standard	High external static pressure	When switching on the power	
	10	–	–	–	–	

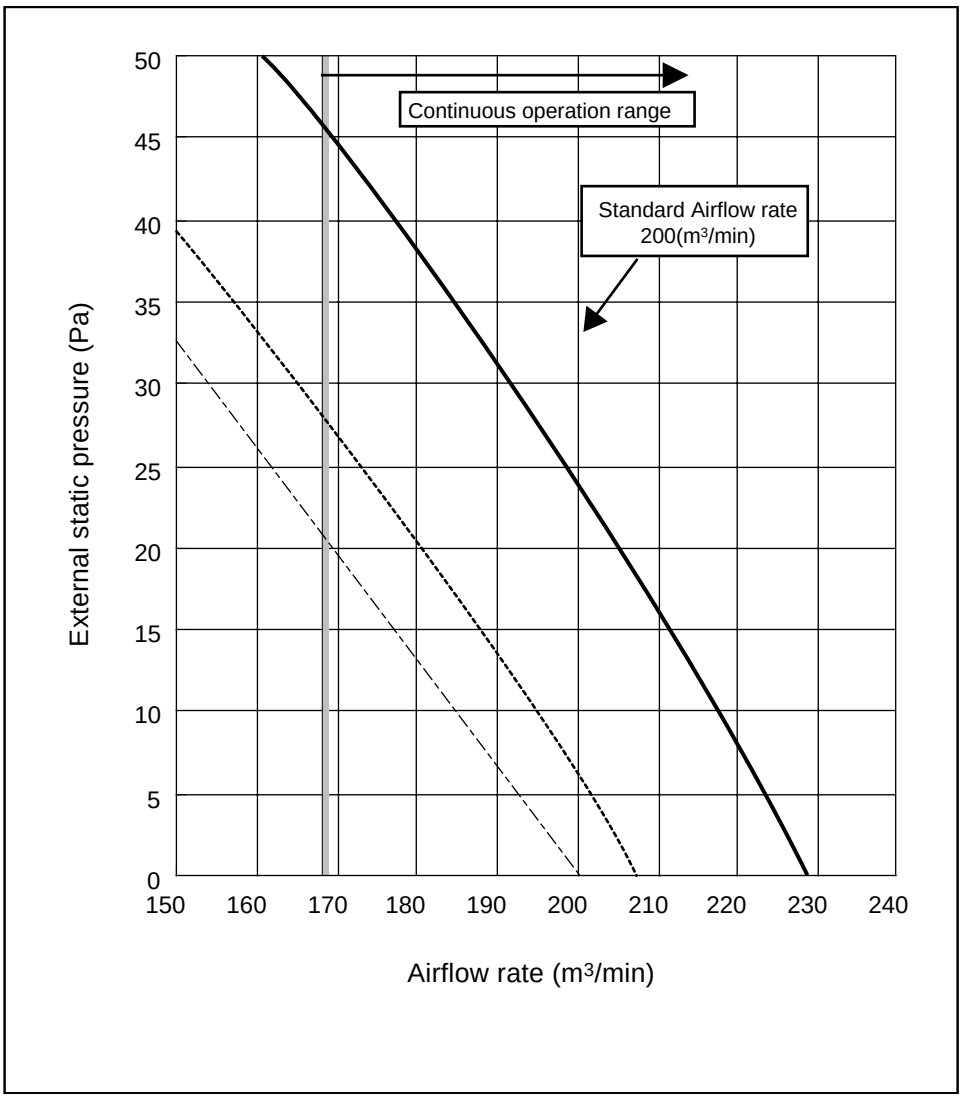
*1

Note:

1. SWU1~2=00 when shipped from the factory. Other factory settings are indicated by shaded portions.
2. If the address is set from 01 to 50, it automatically becomes 100.

2. SW4-9 setting

Fan characteristics curve:DIPSW4-7OFF[FactorySetting],208V•230V/60Hz
Fan characteristics curve:DIPSW4-7ON,208V/60Hz
Fan characteristics curve:DIPSW4-7ON,230V/60Hz



(2) Indoor unit

DIP SW1, 3

Switch		SW name	Operation by SW		Switch set timing		Remarks
			OFF	ON	OFF	ON	
SW1	1	Room temp. sensor position	Indoor unit inlet	Built in remote controller	At unit stopping (at remote controller OFF)		
	2	Clogged filter detect.	None	Provided			
	3	Filter duration	100h	2500h			
	4	OA intake	Ineffective	Effective			Always ineffective for PKFY-NAMU
	5	Remote display select.	Fan output display	Thermo. ON signal display			
	6	Humidifier control	At stationary heating	Always at heat.			
	7	Heating thermo. OFF airflow	Very low speed	Low speed			
	8	Heating thermo. OFF airflow	SW1-7 setting	Set airflow			
	9	Power failure automatic return	Ineffective	Effective			
	10	–	–	–			
SW3	1	Model selection	Heat pump	Cool.only			
	2	Louver (Cooling capacity saving for PKFY-NAMU, effective/ineffective)	None	Provided			
	3	Vane	None	Provided			
	4	Vane swing function	None	Provided			Not provided for PKFY-NAMU Provided for PLFY-NGMU (ON) setting
	5	Vane horizontal angle	1st setting	2nd setting			
	6	Vane angle set for cooling	Down blow B, C	Horizontal			Always down blow B,C for PKFY-NAMU
	7	–	–	–			
	8	Heating 4deg (7.2 deg) up Note : °C scale (°F scale)	Effective	Ineffective			
	9	–	–	–			
	10	–	–	–			

Note 1: The shaded part ▭ indicates the setting at factory shipment. (For the SW not being shaded, refer to the table below.)

2: The DipSW setting is only effective during unit stopping (remote controller OFF) for SW1, 2, 3 and 4 commonly and the power source is not required to reset.)

3: When both SW1-7 and SW1-8 are being set to ON, the fan stops at the heating thermostat of OFF.

Switch \ Model		PLFY-NAMU-A	PDFY-NMU-A	PKFY	
				NAMU-A	NGMU-A
SW1	3	ON	ON	OFF	
	6	ON	ON	OFF	
	7	OFF	OFF	OFF	
SW3	3	ON	OFF	ON	
	4	ON	OFF	OFF	ON
	6	OFF	OFF	OFF	
	8	OFF	OFF	OFF	

Setting of DIP SW2

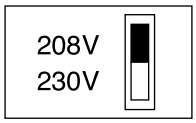
Model	08	10	12	16	20	24
Capacity (model name) code	4	5	6	8	10	13
SW2 setting						

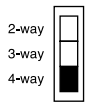
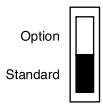
Model	32	40	48
Capacity (model name) code	16	20	25
SW2 setting			

Setting of DIP SW4

Model	Circuit board used	SW4			
		1	2	3	4
PDFY-10 ~ 32	Phase control	ON	OFF	ON	OFF
PLFY-12 ~ 24		OFF	OFF	OFF	ON
PLFY-32 ~ 48		ON	OFF	OFF	ON
PKFY-P-8		OFF	OFF	ON	ON
PKFY-P-12		–	–	–	–
PDFY-40, 48	Relay selection	OFF	OFF	ON	–

Setting of DIP SW5



Switch	Function	Operation by switch	Switch set timing
SWA	Ceiling height setting	(PLFY)  * SWA sets the type of unit, I.E.2, 3 or 4 way blowing. The ceiling height is changed by SWB setting. As shown for SWB explanation below.	Always after powering
SWA	External static pressure setting	(PDFY-10 ~ 32NMU-A) Pa (in.WG)	Always after powering
SWA	External static pressure setting	* For other models, change the setting of static pressure by replacing the connector.	Always after powering
SWB	Setting of air outlet opening	(PLFY) m (ft)	Always after powering
SWC	Airflow control	(PLFY, PKFY-NGMU)  * Set to the option to install the high efficiency filter	Always after powering

	10		16		24		32	
	208V	230V	208V	230V	208V	230V	208V	230V
3 □	80 (0.320)	100 (0.401)	50 (0.200)	60 (0.240)	50 (0.200)	60 (0.240)	–	–
2 ■	50 (0.200)	60 (0.240)	80 (0.320)	100 (0.401)	80 (0.320)	100 (0.401)	SWC Option ■ Standard □	100 (0.401) / 115 (0.461)
							SWC Option □ Standard ■	50 (0.200) / 60 (0.240)
1 □	30 (0.120)	40 (0.160)	30 (0.120)	40 (0.160)	30 (0.120)	40 (0.160)	SWC Option □ Standard ■	30 (0.120) / 40 (0.160)

SWA \ SWB	1	2	3
2-way	3.5 (11.48)	3.8 (12.46)	3.8 (12.46)
3-way	3.0 (9.84)	3.3 (10.82)	3.5 (11.48)
4-way	2.7 (8.86)	3.0 (9.84)	3.5 (11.48)

2 TEST RUN

[1] Before Test Run

(1) Check points before test run

1	Neither refrigerant leak nor loose power source/ transmission lines should be found, if found correct immediately.
2	Confirm that the resistance between the power source terminal block and the ground exceeds 2MΩ by measuring it with a DC500V megger. Do not run if it is lower than 2MΩ. Note : Never apply the megger to the MAIN board. If applied, the MAIN board will be broken.
3	Confirm that the Ball valve at both gas and liquid sides are fully opened. Note : Close the cap.
4	Be sure that the crankcase heater has been powered by turning the main power source on at least 12 hours before starting the test run. The shorter powering time causes compressor trouble.

(2) Caution at inverter check

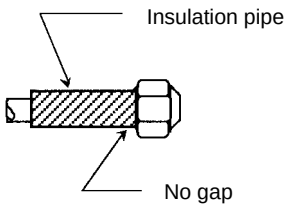
Because the inverter power portion in outdoor unit electrical part box have a lot of high voltage portion, be sure to follow the instructions shown below.

1	During energizing power source, never touch inverter power portion because high voltage (approx. 320V) is applied to inverter power portion.	
2	When checking,	
	▽1	Shut off main power source, and check it with tester, etc.
	▽2	Allow 10 minutes after shutting off main power source.
	▽3	Open the MAIN board mounting panel, and check whether voltage of both ends of electrolytic capacitor is 20V or less.

(3) Check points for test run when mounting options

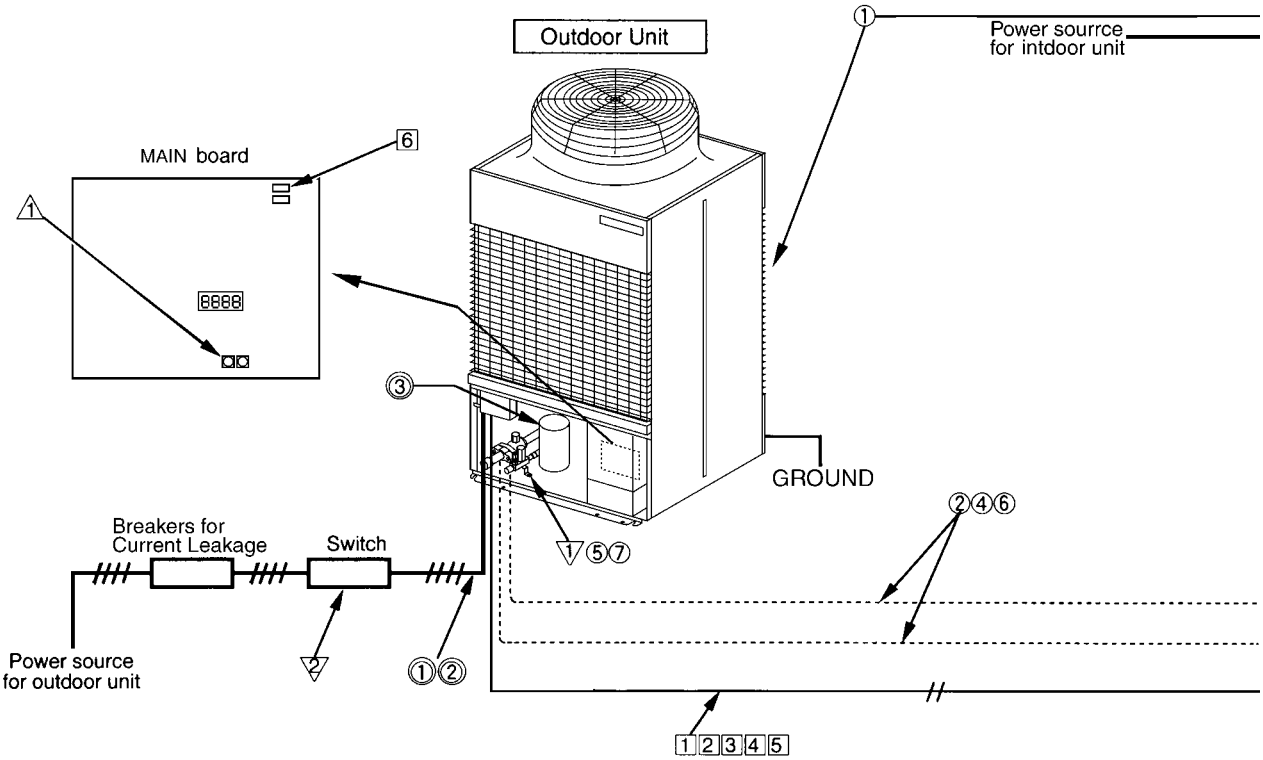
Built-in optional parts	Content of test run	Check point	Result
Mounting of drain water pump mechanism	▽1 Release connector of pump circuit, check error detection by pouring water into drain pan water inlet.	Local remote controller displays code No. “2503”, and the mechanism stops.	
		No overflow from drain pan.	
	▽2 After that, connect connector of circuit.	Drain water comes out by operation of drain pump.	
	▽3 Check pump operations and drainage status in cooling (test run) mode.	Sound of pump operations is heard, and drain water comes out.	
Mounting of permeable film humidifier	Check humidifier operations and water supply status in heating (test run) mode.	No water leak from connecting portions of each water piping.	
		Water is supplied to water supply tank, and float switch is operating.	

(4) Attention for mounting drain water pump mechanism

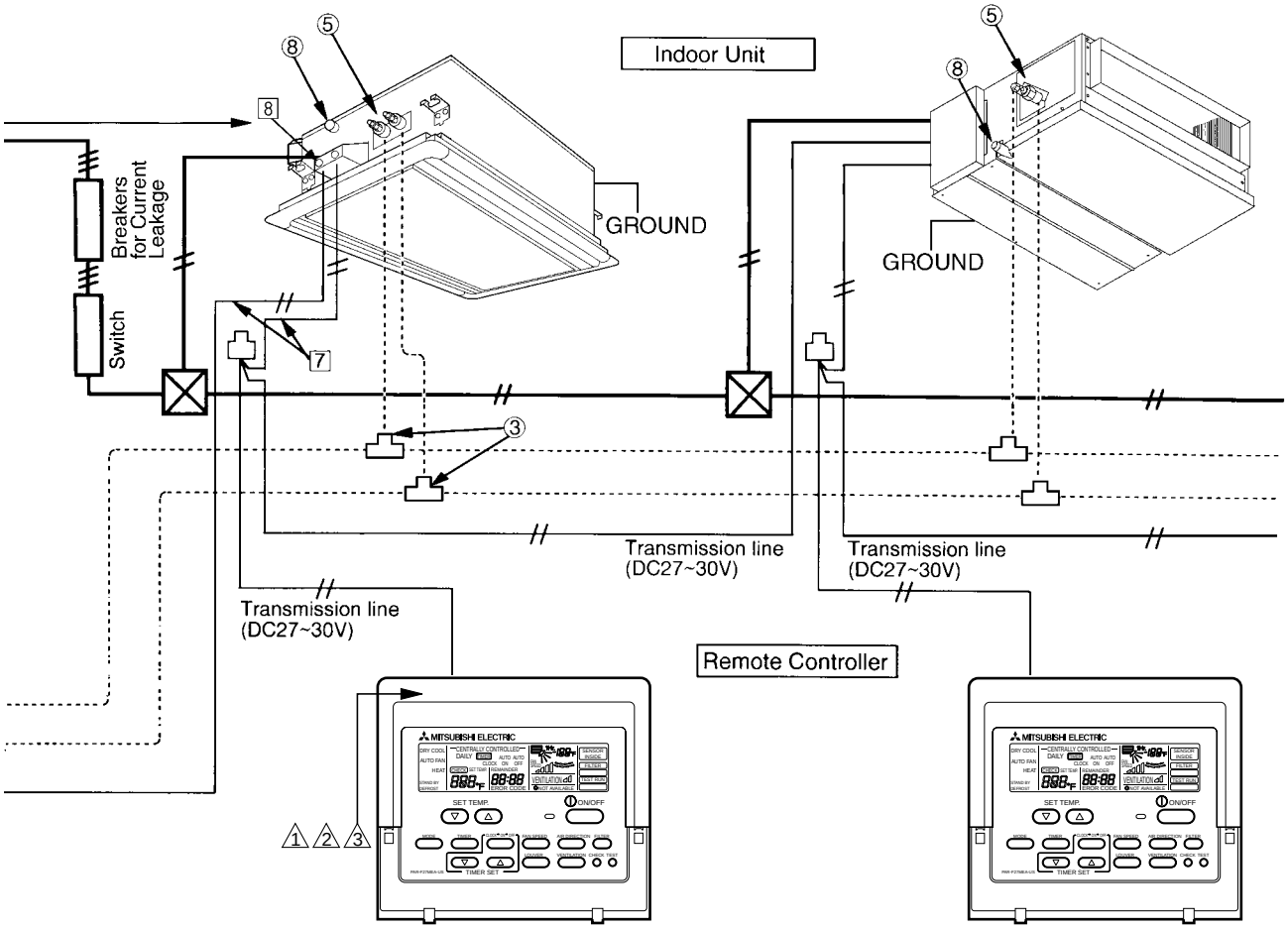
Work	Content of test run	Check point	Result
Disassembling and assembling of drain water pump mechanism	▽1 Lead wire from control box not damaged.		
	▽2 Rubber cap properly inserted in to drain water outlet of drain pan?		
	▽3 Insulation pipe of gas and liquid pipes dealt with as shown on next page?		
	▽4 Drain pan and piping cover mounted without gap?		
	▽5 Drain pan hooked on cut projection of the mechanism?		
Mounting of float switch	Float switch installed without contacting the drain pan?	▽1 Float switch moves smoothly.	
		▽2 Float switch is mounted on mounting board straight without deformation.	
		▽3 Float switch does not contact the copper pipe.	
Electric wiring	▽1 No mistakes in wiring?	Wiring procedure is exactly followed.	
	▽2 Connectors connected securely and tightly?	Connector portion is tightly hooked.	
	▽3 No tension on lead wire when sliding control box?		

(5) Check points for system structure

Check points from installation work to test run.



Classification	Portion	Check item	Trouble
Installation and piping	①	Instruction for selecting combination of outdoor unit, and indoor unit followed? (Maximum number of indoor units which can be connected, connecting model name, and total capacity.)	Not operate.
	②	Follow limitation of refrigerant piping length? For example, 70m (229ft) or less (total length : 220m (721ft)) at the farthest.	Not cool (at cooling). Not heat (at heating).
	③	Connecting piping size of branch piping correct?	
	④	Refrigerant piping diameter correct?	
	⑤	Refrigerant leak generated at connection?	Not cool, not heat, error stop.
	⑥	Insulation work for piping properly done?	Condensation drip in piping.
	⑦	Specified amount of refrigerant replenished?	Not cool, not heat, error stop.
	⑧	Pitch and insulation work for drain piping properly done?	Water leak, condensation drip in drain piping.
Power source wiring	ⓛ	Specified switch capacity and wiring diameter of main power source used?	Error stop, not operate.
	②	Proper grounding work done on outdoor unit?	Electric shock.
	③	The phases of the L line (L1, L2, L3) correct?	Error stop, not operate.



Classification	Portion	Check item	Trouble
Transmission line	1	Limitation of transmission line length followed? For example, 200m (656ft) or less (total length : 500m (1640ft)) at the farthest.	Erroneous operation, error stop.
	2	1.25mm^2 (AWG16) or more transmission line used? (Remote controller 10m (32ft) or less 1.25mm^2 (AWG16))	Erroneous operation, error stop.
	3	2-core cable used for transmission line?	Error stop in case multiple-core cable is used.
	4	Transmission line apart from power source line by 5cm (2in) or more?	Erroneous operation, error stop.
	5	One refrigerant system per transmission line?	Not operate.
	6	The short circuit connector is changed form CN41 to CN40 on the MAIN board when the system is centralized control? (Just one outdoor unit. Not all outdoor units.)	Not operate.
	7	• No connection trouble in transmission line?	Error stop or not operate.
	8	Connection of wrong remote controller line terminals? • MA Remote controller : TB15 • M-NET Remote controller : TB5	Never finish the initial mode.
System set	△1	Address setting properly done? (M-NET Remote controller, indoor unit and outdoor unit.)	Error stop or not operate.
	△2	Setting of address No. done when shutting off power source?	Can not be properly set with power source turned on.
	△3	Address numbers not duplicated?	Not operate.
	△4	Turned on SW3-8 on indoor unit circuit board when mounting room thermistor sensor?	Set temperature not obtained at heating operations (Thermostat stop is difficult)
Before starting	▽1	Refrigerant piping ball valve (Liquid pressure pipe, gas pressure pipe) opened?	Error stop.
	▽2	Turn on power source 12 hours before starting operations?	Error stop, compressor trouble.

[2] Test Run Method

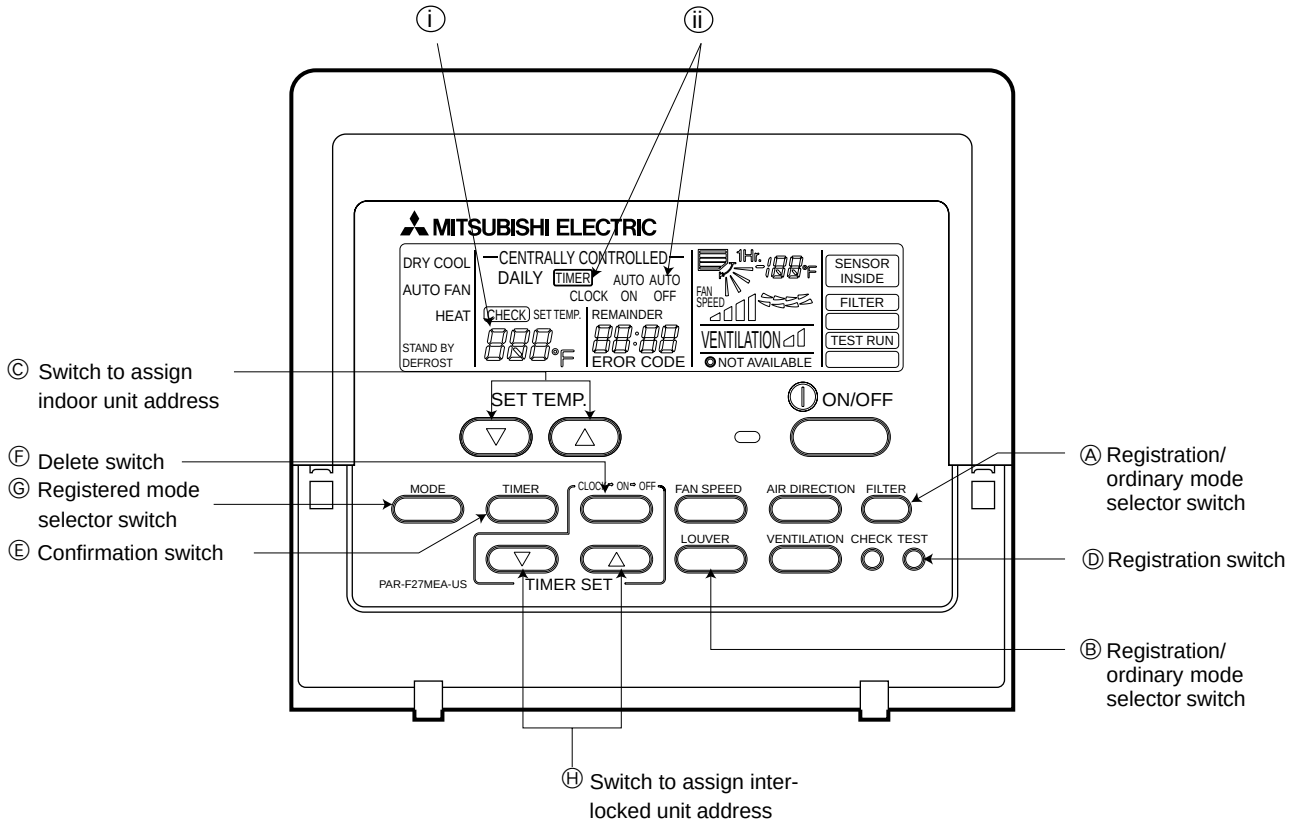
	Operation procedure
①	Turn on universal power supply at least 12 hours before starting → Displaying “HO” on display panel for about two minutes
②	Press (TEST) button twice → Displaying “TEST RUN” on display panel
③	Press (MODE) button → Make sure that air is blowing out
④	Press (MODE) button to change from cooling to heating operation, and vice versa Make sure that warm or cold air is blowing out
⑤	Press (FAN SPEED) adjust button → Make sure that air blow is changed
⑥	Press (AIR DIRECTION) or (LOUVER) button to change direction of air blowing make sure that horizontal or downward blow is adjustable.
⑦	Make sure that indoor unit fans operate normally
⑧	Make sure that interlocking devices such as ventilator operate normally if any
⑨	Press (ON/OFF) button to cancel test run → Stop operation

Note 1: If check code is displayed on remote controller or remote controller does not operate normally.
2: Test run automatically stops operating after two hours by activation of timer set to two hours.
3: During test run, test run remaining time is displayed on time display section.
4: During test run, temperature of liquid pipe in indoor unit is displayed on remote controller room temperature display section.
5: When pressing (FAN SPEED) adjust button, depending on the model, “NOT AVAILABLE” may be displayed on remote controller. However, it is not a malfunction.
6: When pressing (AIR DIRECTION) or (LOUVER) button, depending on the model, “NOT AVAILABLE” may be displayed on remote controller. However, it is not a malfunction.

3 GROUPING REGISTRATION OF INDOOR UNITS WITH M-NET REMOTE CONTROLLER

(1) Switch function

- The switch operation to register with the remote controller is shown below:



Name	Symbol of switch	Name of actual switch	Description
Registration/ordinary mode selection switch	Ⓐ + Ⓑ	(FILTER) + (LOUVER)	This switch selects the ordinary mode or registered mode (ordinary mode represents that to operate indoor units). * To select the registered mode, press the (FILTER) + (LOUVER) button continuously for over 2 seconds under stopping state. [Note] The registered mode can not be obtained for a while after powering. Pressing the (FILTER) + (LOUVER) button displays "CENTRALLY CONTROLLED".
Switch to assign indoor unit address	Ⓒ	(▲) (▼) of TEMP	This button assigns the unit address for "INDOOR UNIT ADDRESS NO."
Registration switch	Ⓓ	(TEST RUN)	This button is used for group/interlocked registration.
Confirmation switch	Ⓔ	(TIMER)	This button is used to retrieve/identify the content of group and interlocked (connection information) registered.
Delete switch	Ⓕ	CLOCK→ ON→OFF	This button is used to retrieve/identify the content of group and interlocked (connection information) registered.
Registered mode selector switch	Ⓖ	(MODE)	This button selects the case to register indoor units as group (group setting mode) or that as interlocked (interlocked setting mode). *The unit address is shown at one spot ⓘ for the group setting mode while at two spots ⓘⓘ for the interlocked setting mode.
Switch to assign interlocked unit address	Ⓗ	(▲) (▼) of TIMER SET	This button assigns the unit address of "OA UNIT ADDRESS NO."

(2) Attribute display of unit

- At the group registration and the confirmation/deletion of registration/connection information, the type (attribute) of the unit is displayed with two English characters.

Display	Type (Attribute) of unit/controller
IC	Indoor unit connectable to remote controller
OC	Outdoor unit
RC	Local remote controller
SC	System controller (MJ)

[Description of registration/deletion/retrieval]

- The items of operation to be performed by the remote controller are given below. Please see the relating paragraph for detail.

1 Group registration of indoor unit
- The group of the indoor units and operating remote controller is registered.
- It is usually used for the group operation of indoor units with different refrigerant system.

2 Retrieval/identification of group registration information of indoor units
- The address of the registered indoor units in group is retrieved (identified).

3 Retrieval/identification of registration information
- The connection information of any unit (indoor/outdoor units, remote controller or the like) is retrieved (identified).

4 Deletion of group registration information of indoor units
- The registration of the indoor units under group registration is released (deleted).

5 Deletion of the address not existing
- This operation is to be conducted when “6607” error (No ACK error) is displayed on the remote controller caused by the miss setting at test run, or due to the old memory remained at the alteration/modification of the group composition.

⚠ **Caution:**
When MELANS (G-50 for example) is being connected, do not conduct the group/pair registration using the remote controller. The group/pair registration should be conducted by MELANS. (For detail, refer to the instruction exclusively prepared for MELANS.)

(3) Group registration of indoor unit

1) Registration method

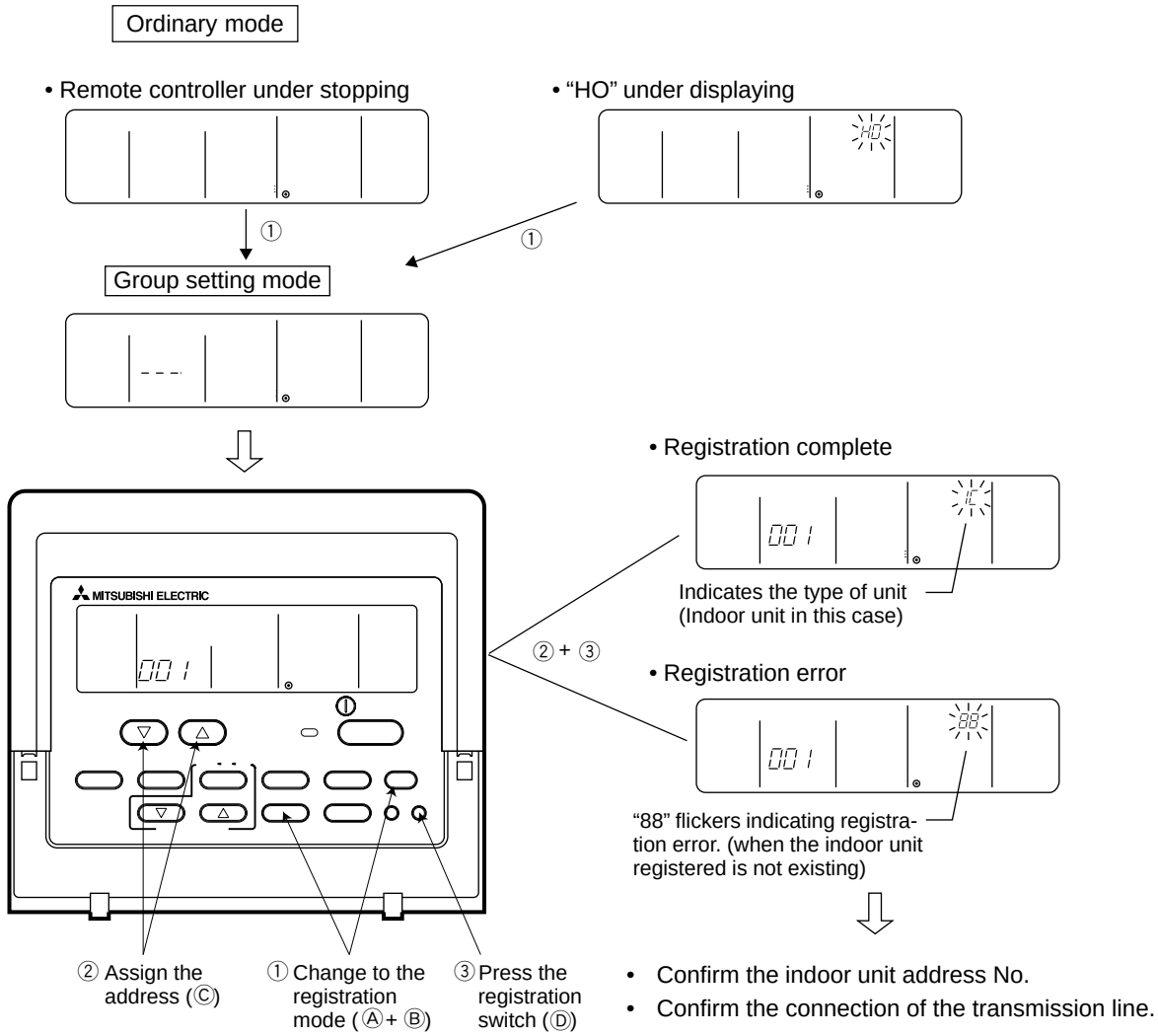
- Group registration of indoor unit 1
  The indoor unit to be controlled by a remote controller is registered on the remote controller.

[Registration procedure]

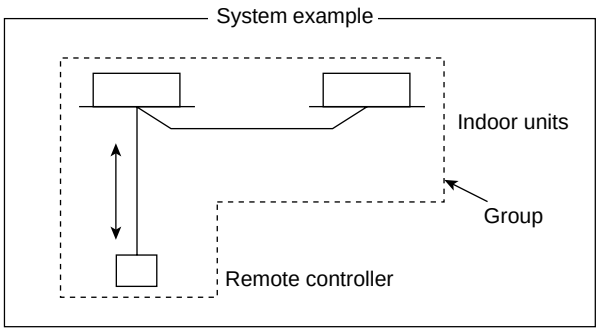
① With the remote controller under stopping or at the display of "HO", continuously press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the registration mode. (See the figure below.)

② Assign the indoor unit address to "INDOOR UNIT ADDRESS NO." by operating the ▲ ▼ (Room temperature adjustment) (Ⓒ).
Then press the TEST RUN button (Ⓓ) to register. In the figure below, the "INDOOR UNIT ADDRESS NO." is being set to 001.

③ After completing the registration, press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the original ordinary mode (with the remote controller under stopping).



- Confirm the indoor unit address No.
- Confirm the connection of the transmission line.



2) Method of retrieval/confirmation

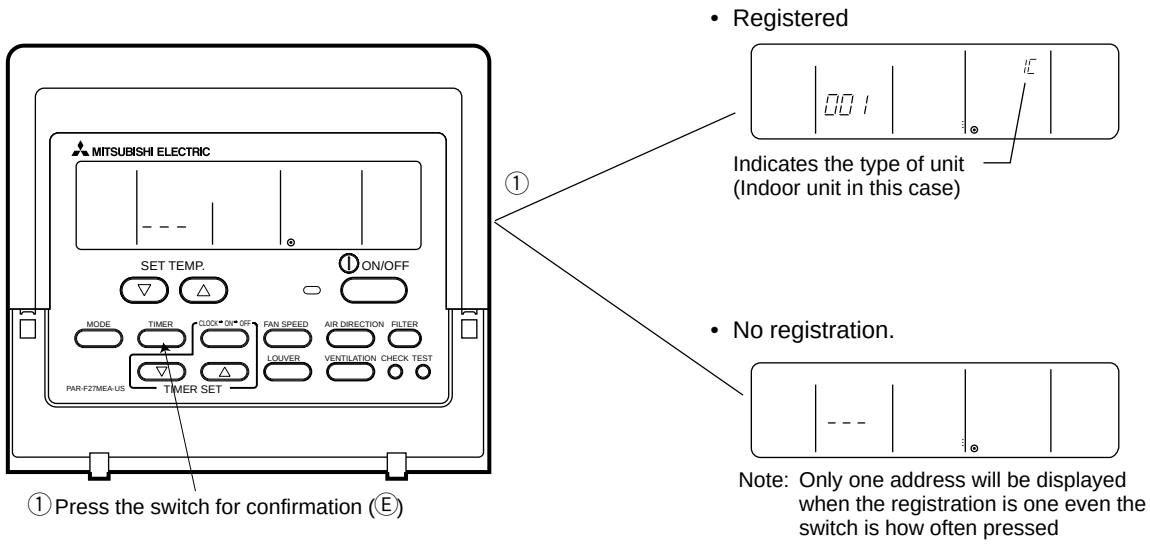
- Retrieval/confirmation of group registration information on indoor unit..... 2
  The address of the indoor unit being registered on the remote controller is displayed.

[Operation procedure]

① With the remote controller under stopping or at the display of “HO”, continuously press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the registration mode.

② In order to confirm the indoor unit address already registered, press TIMER button (Ⓔ). (See figure below.) When the group of plural sets is registered, the addresses will be displayed in order at each pressing of TIMER button (Ⓔ).

③ After completing the registration, continuously press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the original ordinary mode (with the remote controller under stopping).



- Retrieval/confirmation of registration information 3
  The registered information on a certain unit (indoor unit, outdoor unit, remote controller or the like) is displayed.

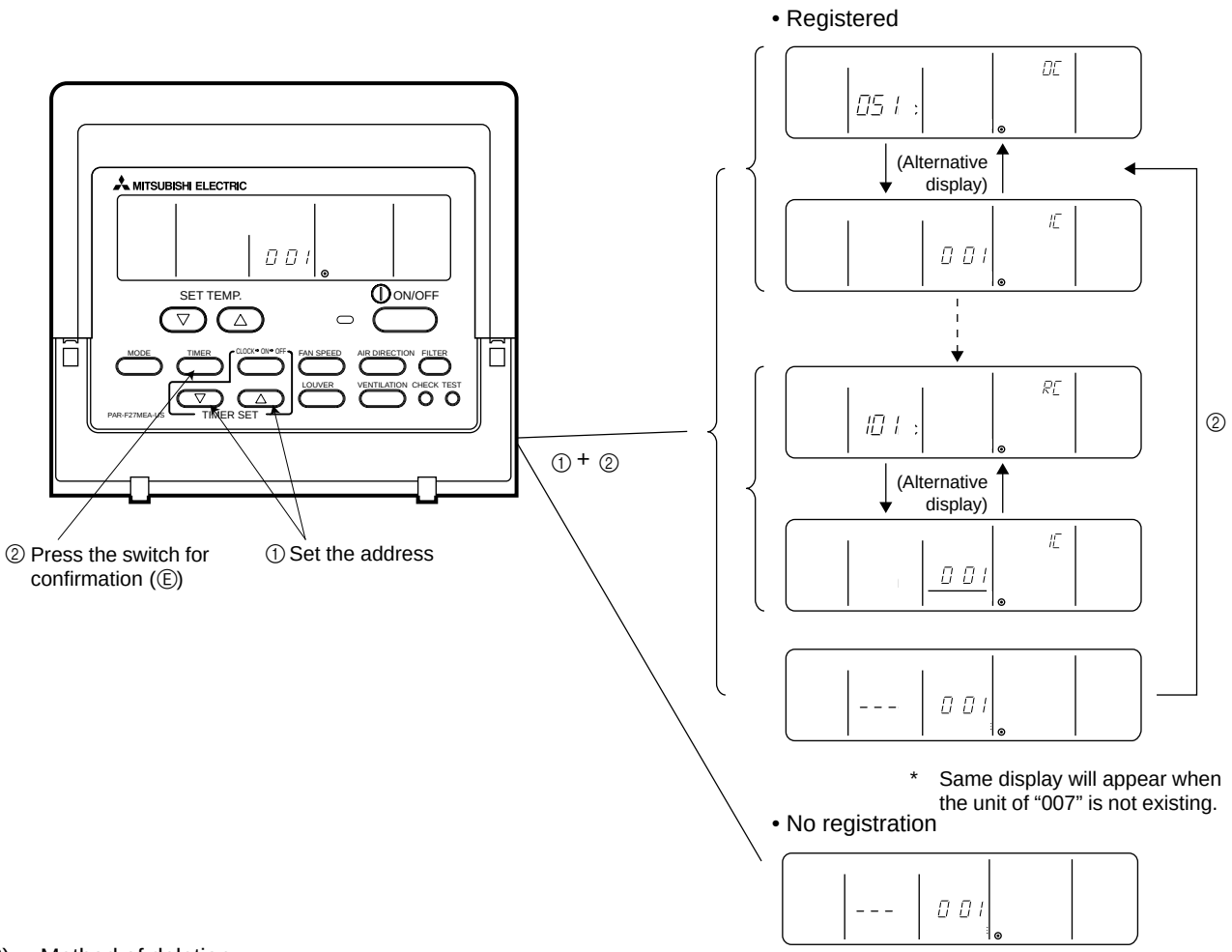
[Operation procedure]

① With the remote controller under stopping or at the display of “HO”, continuously press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the registration mode.

② Operate MODE button (Ⓖ) for the interlocked setting mode. (See figure below.)

③ Assign the unit address of which registration information is desired to confirm with the ▲ ▼ (TIMER SET) switch (Ⓗ). Then press the TIMER button (Ⓔ) to display it on the remote controller. (See figure below.)
Each pressing of TIMER button (Ⓔ) changes the display of registered content. (See figure below.)

④ After completing the retrieval/confirmation, continuously press the FILTER + LOUVER button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the original ordinary mode (with the remote controller under stopping).



3) Method of deletion

- Deletion of group registration information of indoor unit 4

[Operation procedure]

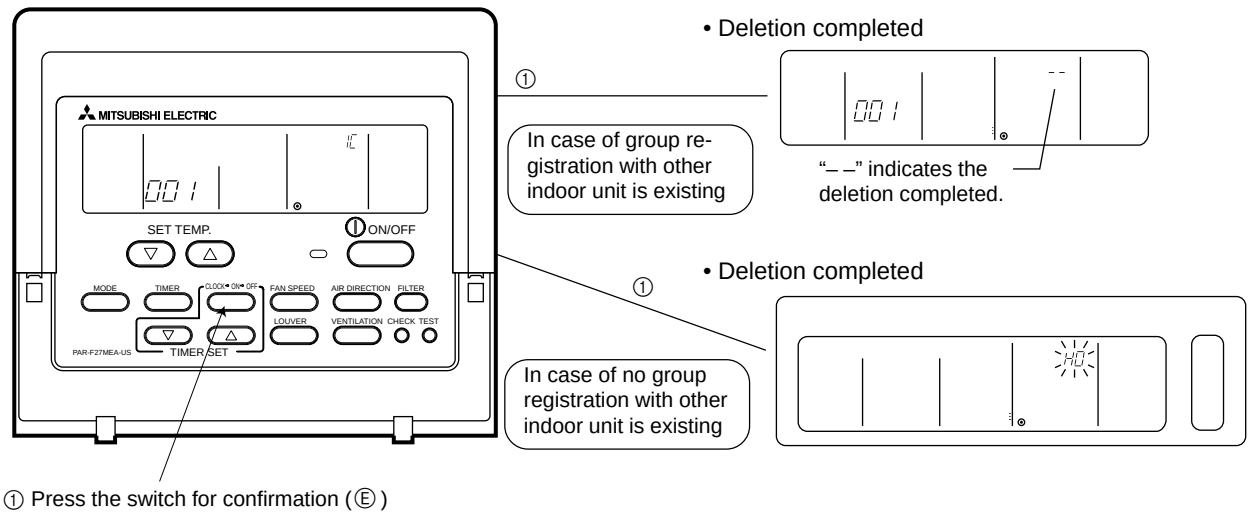
① With the remote controller under stopping or at the display of “HO”, continuously press the (FILTER) + (LOUVER) button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the registration mode.

② Press the (TIMER) button (Ⓔ) to display the indoor unit address registered. (As same as 2)

③ In order to delete the registered indoor unit being displayed on the remote controller, press the (TIMER) CLOCK → ON → OFF (Ⓕ) button two times continuously. At completion of the deletion, the attribute display section will be shown as “ – – “. (See figure below.)

Note: Completing the deletion of all indoor units registered on the remote controller returns to “HO” display.

④ After completing the registration, continuously press the (FILTER) + (LOUVER) button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the original ordinary mode (with the remote controller under stopping).



4) Deletion of information on address not existing

- Deletion of information on address not existing 5

This operation is to be conducted when “6607” error (No ACK error) is displayed on the remote controller caused by the miss setting at test run, or due to the old memory remained at the alteration/modification of group composition, and the address not existing will be deleted.

Note: The connection information (connection between indoor unit and outdoor unit) on the refrigerant system can not be deleted.

An example to delete the system controller of “250” from the indoor unit of “007” is shown below.

[Operation procedure]

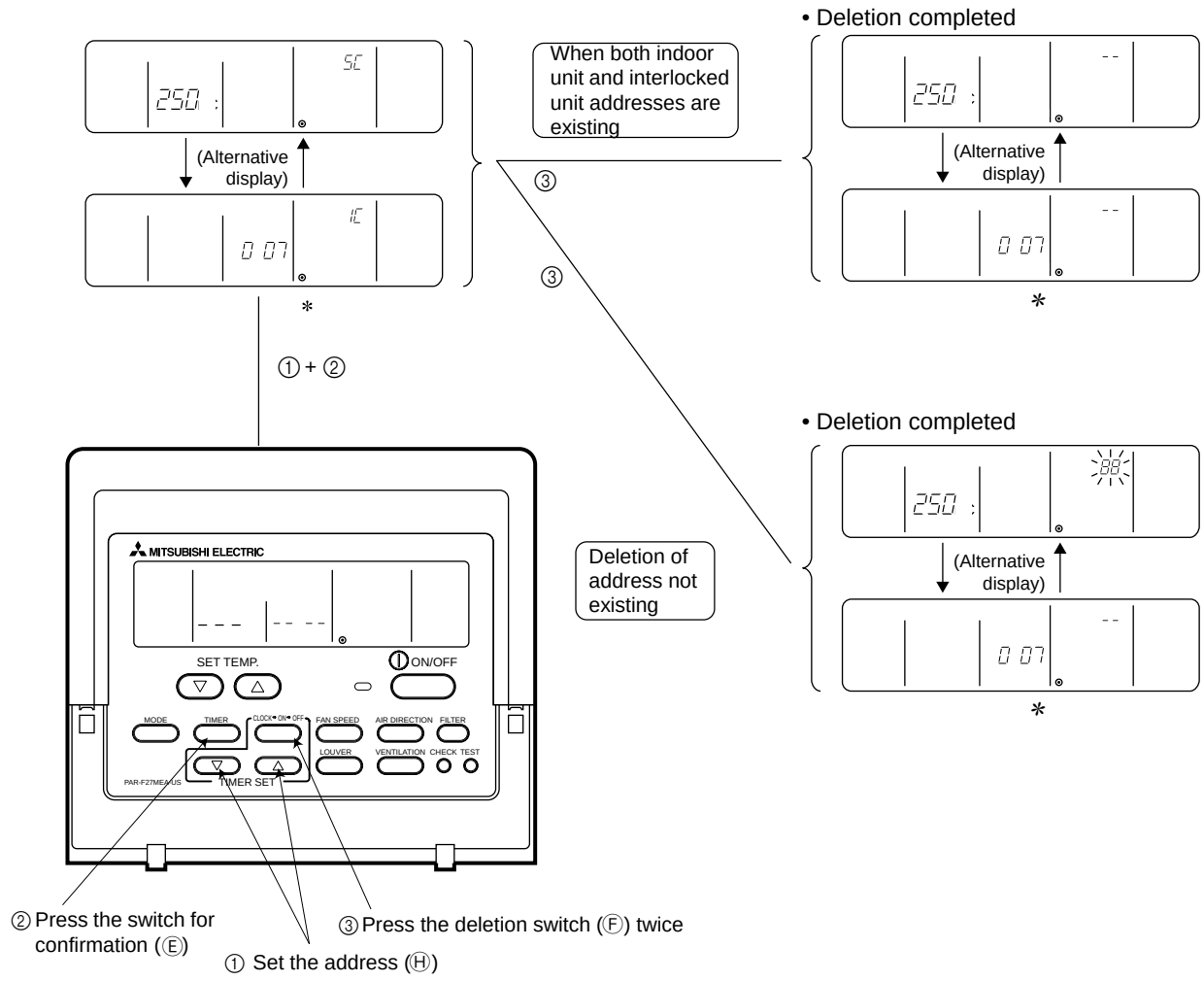
① With the remote controller under stopping or at the display of “HO”, continuously press the (FILTER) + (LOUVER) button (Ⓐ + Ⓑ) at the same time for 2 seconds to change to the registration mode.

② Operate (MODE) button (Ⓖ) for the interlocked setting mode (ii). (See the figure below.)

③ Assign the unit address existing to “OA UNIT ADDRESS No.” with the (▲) (▼) (TIMER SET) switch (Ⓗ), and press (TIMER) button (Ⓔ) to call the address to be deleted. (See the figure below.) As the error display on the remote controller is usually transmitted from the indoor unit, “OA UNIT ADDRESS No.” is used as the address of the indoor unit.

④ Press the (TIMER) CLOCK → ON →OFF button (Ⓕ) twice. (See the figure below.)

⑤ After completing the deletion, continuously press the (FILTER) + (LOUVER) button (Ⓐ + Ⓑ) at the same time for 2 seconds to return to the original ordinary mode (with the remote controller under stopping).



4 CONTROL

[1] Control of Outdoor Unit

(1) Initial processing

- When turning on power source, initial processing of microcomputer is given top priority.
- During initial processing, control processing corresponding to operation signal is suspended. The control processing is resumed after initial processing is completed. (Initial processing : Data processing in microcomputer and initial setting of each LEV opening, requiring approx. 2 minutes at the maximum.)

(2) Control at staring

- In case unit is started within 2 hours after turning on power source at low outdoor air temperature (+5˚C (41°F) or less), the unit does not start operating for 30 minutes at the maximum .

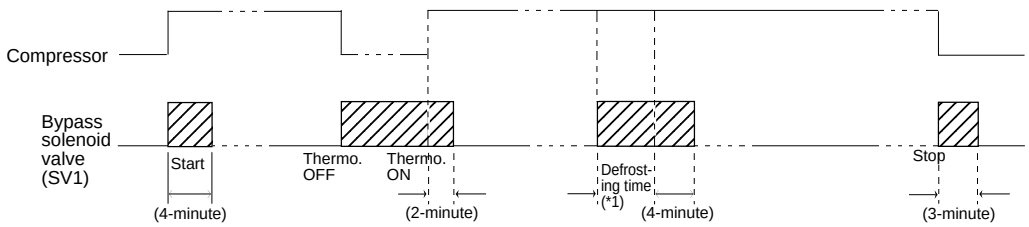
(3) Bypass, capacity control

- Solenoid valve consists of bypass solenoid valve (SV1, SV2) bypassing between high pressure side and low pressure side. The following operation will be provided.

1) Bypass solenoid valves SV1 and SV2 (both "open" when turned on)

Item	SV1		SV2	
	ON (Open)	OFF (Close)	ON (Open)	OFF (Close)
When starting compressor	Turned on for 4 minutes		—	
After thermost "ON is returned and after 3 minutes restart	Turned on for 2 minutes		—	
When compressor stops in cooling or heating mode	Always turned on		—	
After operation stops	Turned on for 3 minutes		—	
During defrosting operations (See figure below *1)	Always turned on		—	
During oil recovery operations	Always turned on in oil recovery operation after low frequency continuous operations		—	
During 20Hz operations, at fall in low pressure saturation temperature. (ET) (3 minutes or more after starting)	—		When low pressure saturation temp. (ET) is -30˚C (-22°F) or less	When low pressure saturation temp. (ET) is -15˚C (5°F) or more
When high pressure rises (Pd)	When Pd reaches 27.5kg/cm²G (391psi) or more	When Pd is 24kg/cm²G (341psi) or less 30 seconds	When Pd reaches 26kg/cm²G (370psi) or more	When Pd is 23kg/cm²G (327psi) or less after 30 seconds
When high pressure rises (Pd) during 20Hz operations (3 minutes after starting)	—		Turned on when high pressure (Pd) exceeds pressure limit	When high pressure (Pd) is 20kg/cm²G (284psi) or less
When discharge temperature rises (3 minutes after starting)	—		When temp. exceeds 130˚C (266°F) and Pd reaches 15kg/cm²G (213psi) or more	When discharge temp. is 115˚C (239°F) or less

* Ex. SV1



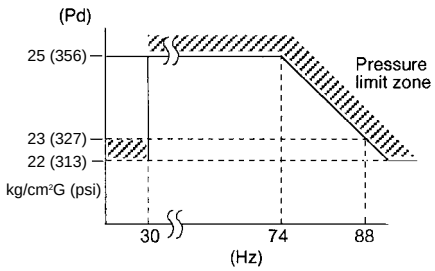
(4) Frequency control

- Depending on capacity required, capacity control change and frequency change are performed to keep constant evaporation temperature (0˚C) in cooling operations, and high pressure (18kg/cm²G) in heating operation.
- Frequency change is perfprmed at the rate of 3Hz/second across 20 ~ 110Hz range.

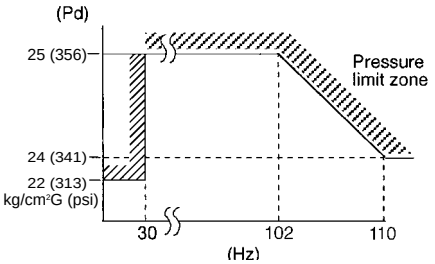
1) Frequency control starting
   - 60Hz is the upper limit for 3 minutes after starting.
   - 75Hz is the upper limit within 2 hours after turning on power source, and 30 minutes after starting compressor.

2) Pressure limit
   The upper limit of high pressure (Pd) is set for each frequency.
   When the limit is exceeded, frequency is reduced every 10 seconds.
   (Frequency decrease rate (Hz) : 22% of the present value)

<80TM>



<100TM>



3) Discharge temperature limit
   Discharge temperature (Td) of compressor is detected during operation. If the upper limit is exceeded, the frequency is reduced. (Change rate : 5% of the present value)
   - 30 seconds after starting compressor, control is performed every minute.
   - Operation temperature is 130˚C (266°F).

4) Periodical frequency control
   Frequency controll is periodically performed except for the frequency controls at operation start, status change, and protection.

   ① Cycle of periodical frequency control
   Periodical frequency control is performed every minute after the time specified below has passed.
   - 20 sec after starting compressor or finishing defrostoing operations
   - 20 sec after frequency control by discharge temperature or pressure limit

   ② Amount of frequency change
   The amount of frequency change is controlled corresponding to evaporation temperature (ET) and high pressure (Pd).

③ Back up of frequency control by bypass valve

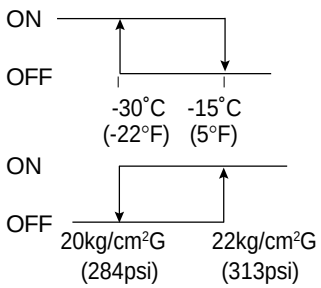
During 20Hz operations, frequency is backed up by turning on (opening) bypass valve (SV2).

• Cooling

During 20Hz operations 3 minutes after starting compressor, bypass valve is turned on when ET is -30˚C (-22°F) or less, and turned off when ET is -15˚C (5°F) or more.

• Heating

During 20Hz operations 3 minutes after starting compressor, SV2 turned on when high pressure (Pd) exceeds pressure limit (See previous page.), and turned off when Pd falls to 20kg/cm²G or less.



(5) Oil return control (Electronic expansion valve <SLEV>)

Oil return LEV (SLEV) opening is dependent on frequency and outdoor air temperature.

SLEV is closed (0) when compressor stops, and SLEV is set (64) for 10 minutes after starting compressor

(Number of pulse)

Operation mode	Frequency / Outdoor air temp.	20 ~ 74Hz	75 ~96Hz	97Hz or more
Cooling (Dry)	28˚C (82.4°F) or more	111	111	157
	20 ~ 30˚C (68~86°F)	87	87	134
	22˚C (71.6°F) or less	64	64	87
Operation mode	Frequency / Outdoor air temp.	20 ~ 74Hz	75 ~96Hz	97Hz or more
Heating	–	87	87	111

Note : 1. Differential of outdoor air temperature is 2 degrees.
2. The opening shown above may be expanded for preventing rise in discharge temperature (at Td ≧ 90˚C).

(6) Subcool coil control (electronic expansion valve <LEV1>)

- The amount of super heat detected from the bypass outlet temperature of subcool coil (TH8) is controlled to be within a certain range for each 20 sec.
- The opening angle is corrected and controlled depending on the outlet/inlet temperature of subcool coil (TH5, TH7) and the discharge temperature.
- However, the valve will be closed (0) at heating and compressor stopping.
- It will fully open at defrosting.

(7) Defrost operation control

1) Starting of defrost operations
- After integrated 50 minutes of compressor operations, defrosting operations start when –2˚C (28.4°F) or less of piping temperature (TH5) is detected for 10 consecutive minutes.
- Forcible defrosting operations start by turning on forcible defrost switch (SW2-7) if 10 minutes have already elapsed after compressor start or completion of defrosting operations.

2) Completion of defrosting operations

Defrosting operations stop when 10 minutes have passed since start of defrosting operation, or piping temperature (TH5) reaches 12˚C (53.6°F) (80TMU), 8˚C (46.4°F) (100TMU) or more.

(Defrosting operations do not stop for 2 minutes after starting, except when piping temperature exceeds 20˚C.)

3) Defrosting prohibition

Defrosting operations do not start during oil recovery, and for 10 minutes after starting compressor.

4) Trouble during defrosting operations

When trouble is detected during defrosting operations, the defrosting operations stop, and defrosting prohibition time decided by integrated operation time of compressor is set to be 20 minutes.

5) Change in number of operating indoor units during defrosting operations
- In case number of operating indoor units changes during defrosting operations, the defrosting operations continue, and control of unit number change is performed after the defrosting operations are finished.
- Even in case all indoor units stop or thermostat is turned off during defrosting operations, the defrosting operations do not stop until expected defrosting activities are completed.

(8) Control of liquid level detecting heater

Detect refrigerant liquid level in accumulator, and heat refrigerant with liquid level heater for judging refrigerant amount. 6 steps of duty control is applied to liquid level heater depending on frequency and outdoor air temperature, 1minute after starting compressor.

(9) Judgement of refrigerant amount

■**Cooling**

Compressor Frequency / TdSH	20~45Hz	46~70Hz	71Hz~Fmax
50<TdSH	AL=0	AL=0	AL=0
45<TdSH≦50	AL=1	AL=0	AL=0
40<TdSH≦45	AL=1	AL=1	AL=0
20<TdSH≦40	AL=1	AL=1	AL=1
TdSH≦20	AL=2	AL=2	AL=2

■**Heating**

TH5 / TdSH	TH5<5°C	5°C≦TH5<15°C	15°C≦TH5
90<TdSH	AL=0	AL=0	AL=0
70<TdSH≦90	AL=1	AL=0	AL=0
50<TdSH≦70	AL=1	AL=1	AL=0
20<TdSH≦50	AL=1	AL=1	AL=1
TdSH≦20	AL=2	AL=2	AL=2

TdSH=Discharge Super Heat.
=Td-Tsg (low pressure saturation temperature)

(10) Refrigerant recovery control

Refrigerant recovery is conducted to prevent refrigerant from accumulating in the stopped unit (fan unit), the unit under cooling mode and that with heating thermostat being turned off.

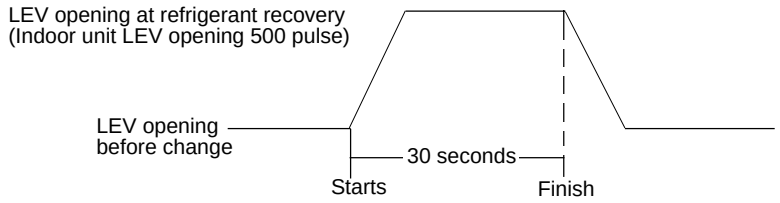
1) Start of refrigerant recovery

① Refrigerant recovery is started when the two items below are fully satisfied.

- 30 minutes has passed after finishing refrigerant recovery.
- The level detector detects AL = 0 for 3 minutes continuously, or when the discharge SH is high.

2) Refrigerant recovery operation

- Refrigerant is recovered by opening LEV of the objective indoor units (indoor units under stop. fan, and cooling modes, and that with heating thermostat being turned off) for 30 seconds.



- The regular capacity control of the outdoor unit and the regular LEV control of the indoor unit are not applied during refrigerant recovery operation, but are fixed with the value before the recovery operation. These controls will be conducted one minute after finishing the recovery operation.
- Defrosting operation is prohibited during the recovery operation, and it will be conducted after finishing the recovery operation.

(11) Control of outdoor unit fan and outdoor unit heat exchanger capacity

1) Control system

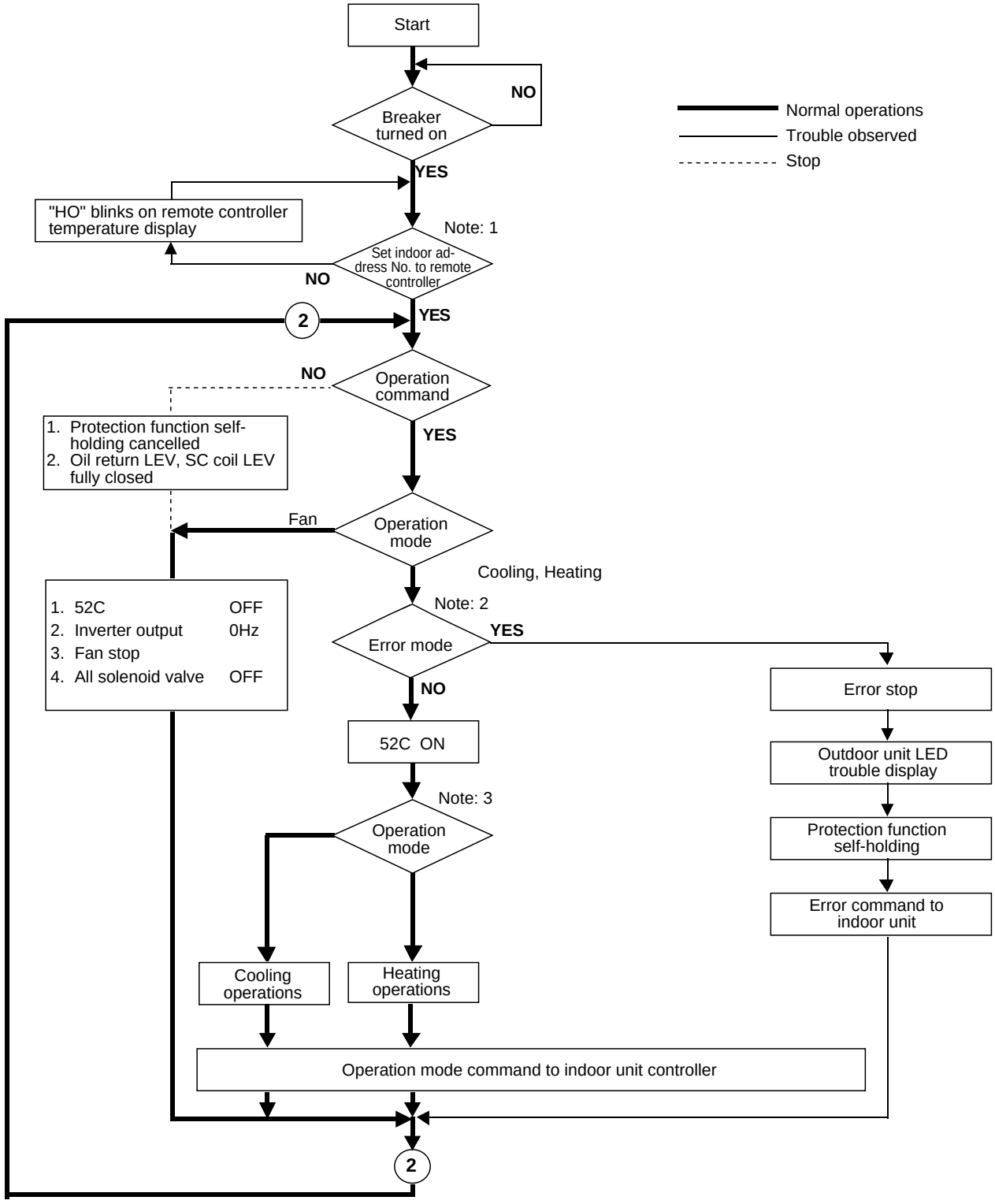
Depending on capacity required, control outdoor fan flow rate with phase control, for maintaining evaporation temperature (0˚C (32°F) when TH6 ≧ 20˚C (68°F) , lower than 0˚C (32°F) when TH6<20˚C (68°F)) in cooling operations, and high pressure 18kg/cm^{2}G (256psi) in heating operations.

2) Control

- Outdoor unit fan stops when compressor stops.
- Fan is in full operation for 5 seconds after starting.
- Outdoor unit fan stops during defrosting operations.

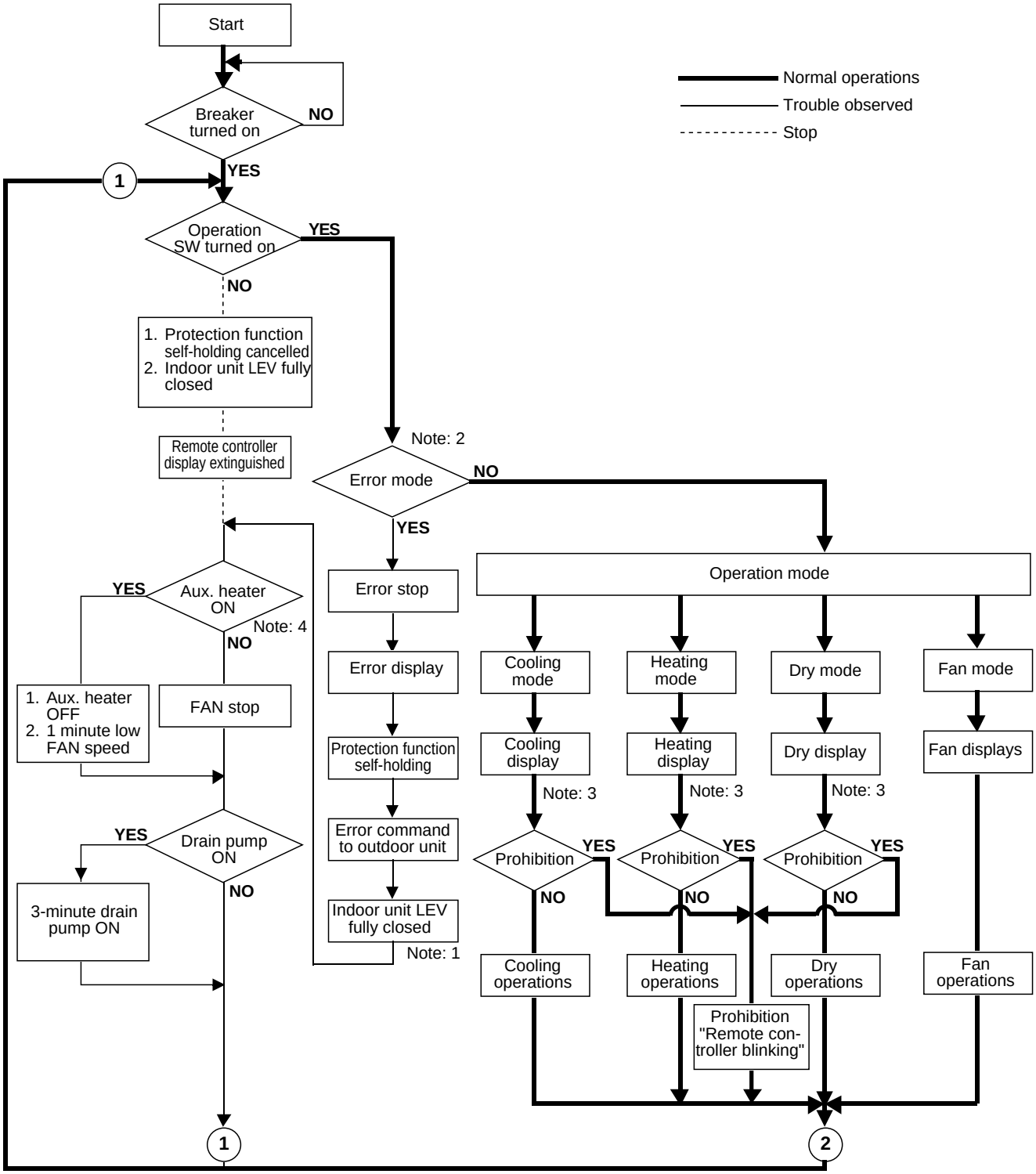
[2] Operation Flow Chart

(1) Outdoor unit (Cooling, heating modes)



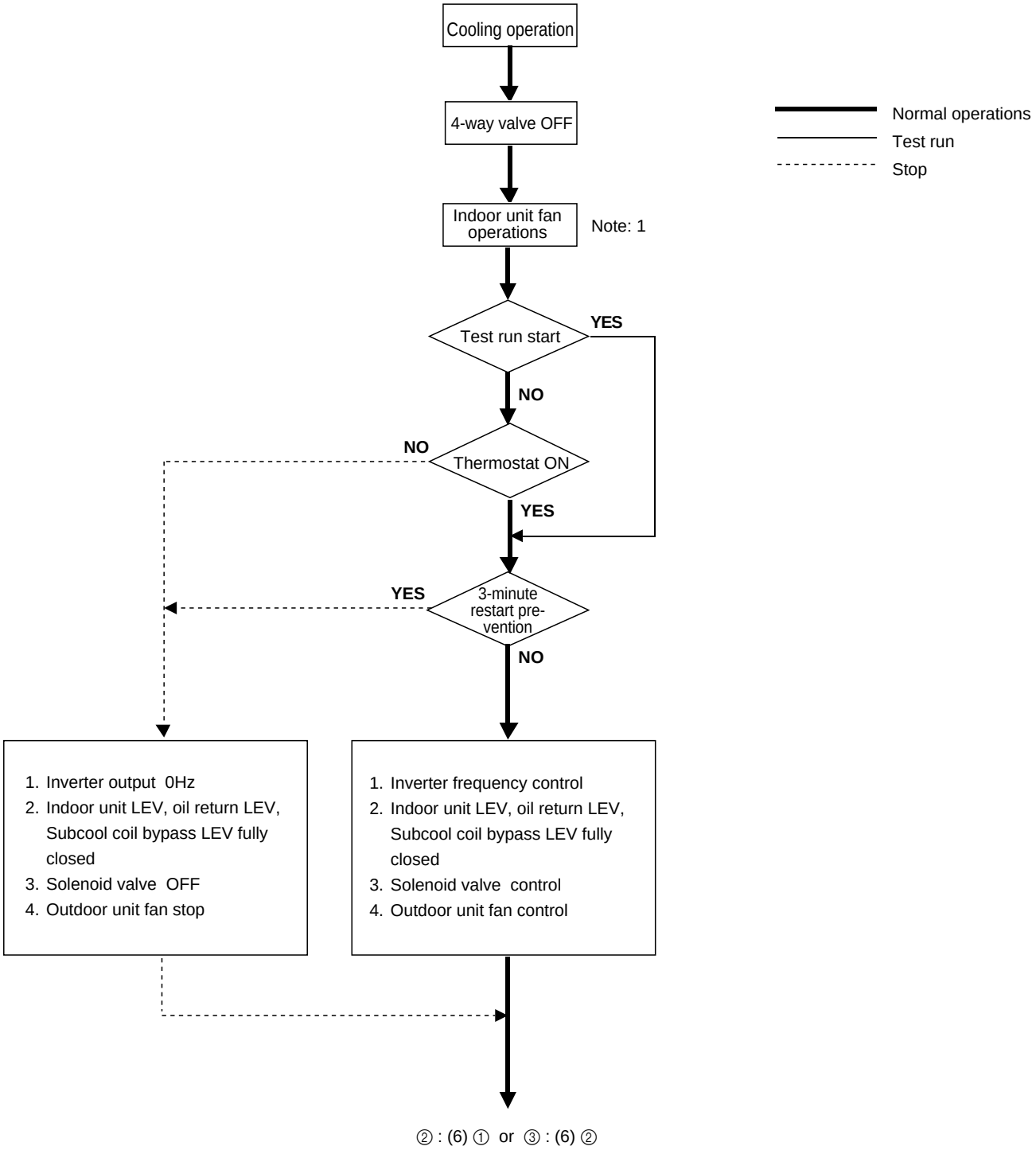
Note: 1	For about 2 minutes after turning on power source, address and group information of outdoor unit, indoor unit, and remote controller are retrieved by remote controller, during which "HO" blinks on and off on remote controller. In case indoor unit is not grouped to remote controller, "HO" display on remote controller continues blinking even after 2 minutes after turning on power source.
Note: 2	Two trouble modes included indoor unit side trouble, and outdoor unit side trouble. In the case of indoor unit side trouble, error stop is observed in outdoor unit only when all the indoor units are in trouble. However, if one or more indoor units are operating normally, outdoor unit shows only LED display without undergoing stop.
Note : 3	Operation mode conforms to mode command by indoor unit. However, when outdoor unit is being under cooling operation, the operation of indoor unit will be prohibited even by setting a part of indoor units under operation, or indoor unit under stopping or fan mode to heating mode. Reversely when outdoor unit is being heating operation, the same condition will be commenced.

(2) Indoor unit (Cooling, heating, dry, and fan modes)



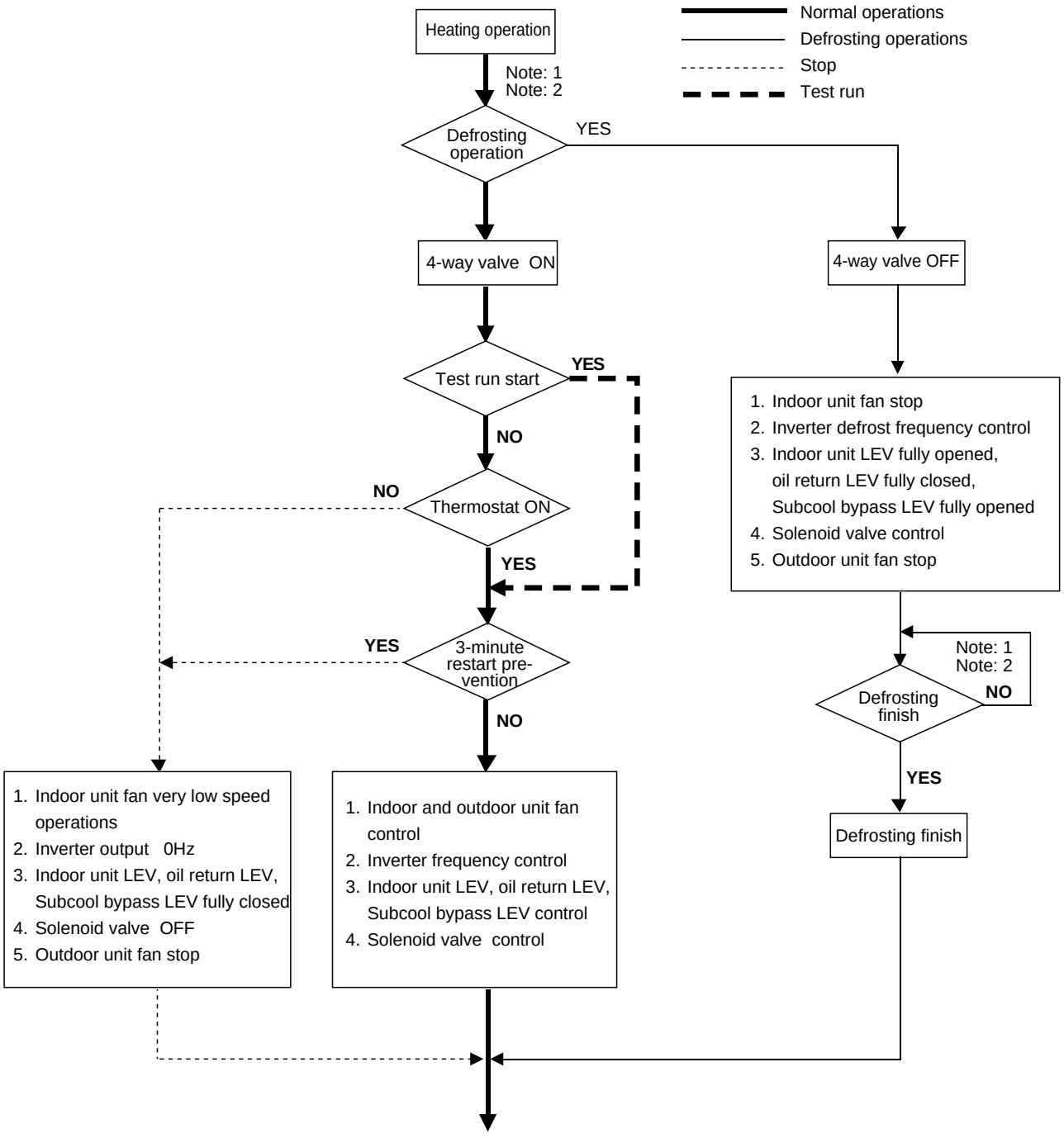
Note : 1	At indoor unit LEV fully closed, the opening angle indicates 41.
Note : 2	The error mode includes that of indoor unit and that of outdoor unit. In the former case, the indoor unit in question only stops in error mood, while in the later case, all indoor units connected to the outdoor unit stop in error mode.
Note: 3	The operation mode follows the mode command from the indoor unit. However, when the outdoor unit is under cooling operation, the operation of the indoor unit will be prohibited even a part of indoor units or indoor unit under stopping or fa n mode is put into heating mode. Contrarily, when the outdoor unit is under heating operation, the same condition will be commenced.
Note: 4	The auxiliary heater can only be equipped to the product of special specification.

(3) Cooling operation



Note : 1	Indoor unit fan operates at set notch in cooling operation regardless of thermostat ON/OFF.

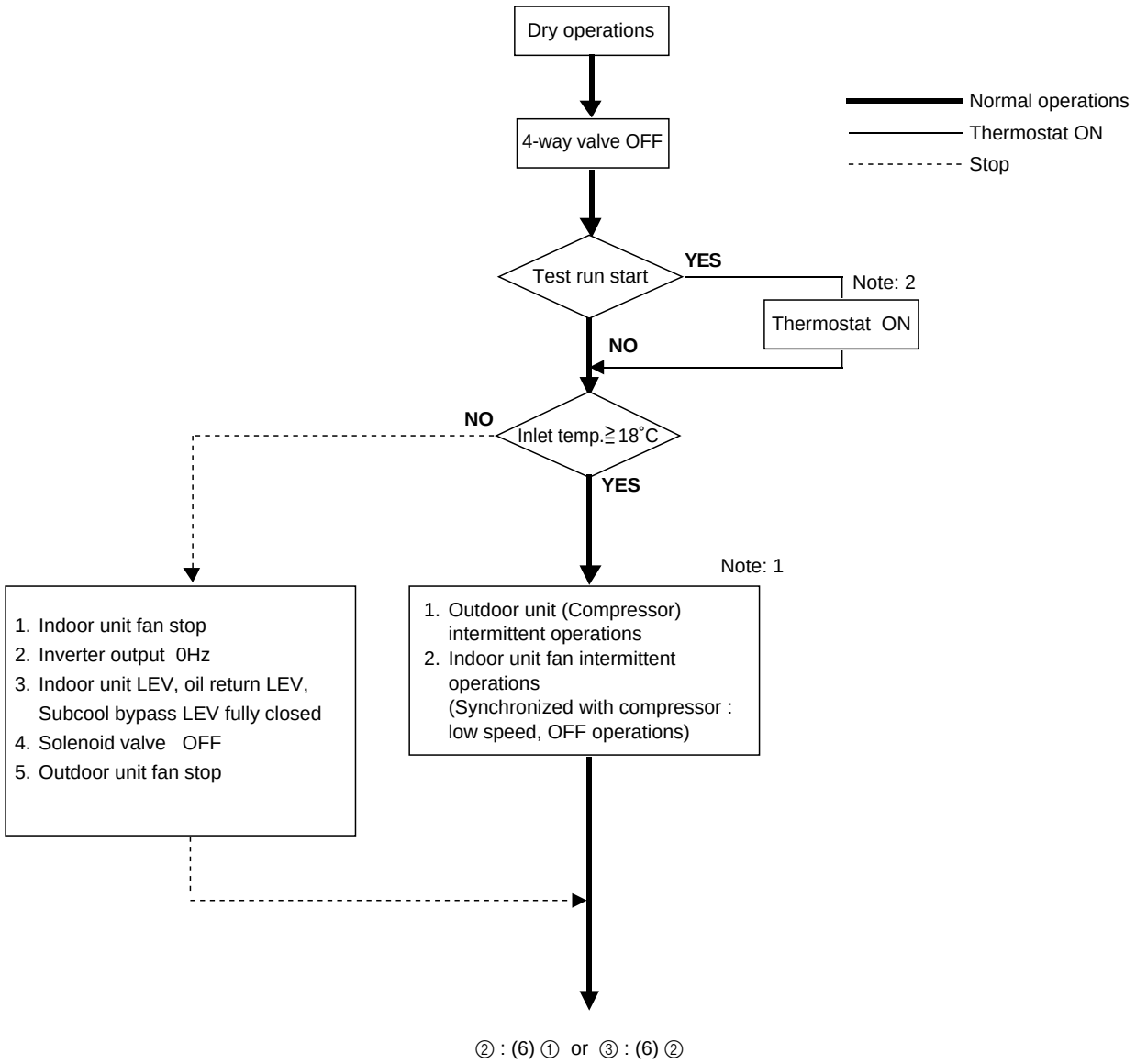
(4) Heating operation (Only for PUHY)



① : (6) ④ or ③ : (6) ②

Note : 1	When outdoor unit starts defrosting, it transmits defrost operations command to indoor unit, and the indoor unit starts defrosting operations. Similarly when defrosting operation stops, indoor unit returns to heating operation after receiving defrost end command of outdoor unit.
Note : 2	Defrosting start condition : After integrated 50 minutes of compressor operations, and –2˚C or less outdoor unit coil temperature. Defrosting end condition : After 15 minutes of defrosting operation or the outdoor unit coil temperature having risen to 12˚C (80TMU), 8˚C (100TMU) or more for 80TMU and 100TMU.

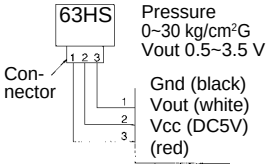
(5) Dry operation



② : (6) ① or ③ : (6) ②

Note : 1	When indoor unit inlet temperature exceeds 18˚C, outdoor unit (compressor) and indoor unit fan start intermittent operations synchronously. Operations of outdoor unit, indoor unit LEV and solenoid valve accompanying compressor are the same as those in cooling operations.
Note : 2	Thermostat is always kept on in test run, and indoor and outdoor unit intermittent operation (ON) time is a little longer than normal operations.

[3] List of Major Component Functions

	Name	Symbol (function)	Part code	Application	Specification	Check method
Outdoor unit	Compressor	MC		Adjust refrigerant circulation by controlling operating frequency and capacity control valve with operating pressure.	Low pressure shell scroll type with capacity control mechanism Winding resistance: Each phase 0.107Ω (20˚C)	
	Pressure sensor	63HS		1) High press. detection. 2) Frequency control and high pressure protection		
	Pressure switch	63H		1) High pressure detection 2) High pressure protection	Setting 30kg/cm²G OFF	Continuity check
	Thermistor	TH1 (discharge)		1) Discharge temperature detection 2) High pressure protection 20˚C (68˚F) : 250kΩ 70˚C (158˚F) : 34kΩ 30˚C (86˚F) : 160kΩ 80˚C (176˚F) : 24kΩ 40˚C (104˚F) : 104kΩ 90˚C (194˚F) : 17.5kΩ 50˚C (122˚F) : 70kΩ 100˚C (212˚F) : 13.0kΩ 60˚C (140˚F) : 48kΩ 110˚C (230˚F) : 9.8kΩ	R_{120}=7.465kΩ $B_{25/120}$=4057 Rt = $7.465\exp\{4057(\frac{1}{273+t}-\frac{1}{393})\}$	Resistance value check
		TH2 (low pressure saturation temperature)		1) Detects the saturated vapor temperature. 2) Calculates the refrigerant circulation configuration. 3) Controls the compressor frequency. 4) Controls the outdoor unit's fan air volume.	R_0=33kΩ $B_{0/100}$=3965 Rt = $33\exp\{3965(\frac{1}{273+t}-\frac{1}{273+0})\}$ -20˚C (-4˚F) : 92kΩ -10˚C (14˚F) : 55kΩ 0˚C (32˚F) : 33kΩ 10˚C (50˚F) : 20kΩ 20˚C (68˚F) : 13kΩ 30˚C (86˚F) : 8.2kΩ	Resistance value check
		TH5 (piping temperature)		1) Frequency control 2) Defrost control and liquid level detection at heating	R_0=15kΩ $B_{0/100}$=3460 Rt = $15\exp\{3460(\frac{1}{273+t}-\frac{1}{273})\}$ 0˚C (32˚F) : 15kΩ 10˚C (50˚F) : 9.7kΩ 20˚C (68˚F) : 6.4kΩ 25˚C (77˚F) : 5.3kΩ 30˚C (86˚F) : 4.3kΩ 40˚C (104˚F) : 3.1kΩ	
		TH6 (outdoor air temperature)		1) Outdoor air temperature detection 2) Fan control, liquid level heater, and opening setting for oil return		
		TH7 (subcool coil outlet temperature)		Subcool coil bypass LEV (LEV1) control		
		TH8 (subcool coil bypass outlet temperature)		Subcool coil bypass LEV (LEV1) control		
		THHS		1) Detects the inverter cooling fin temperature. 2) Provides inverter overheating protection. 3) Controls the control box cooling fan.	R_{50}=17kΩ $B_{25/50}$=4170 Rt = -20˚C (-4˚F) : 605.0kΩ -10˚C (14˚F) : 323.3kΩ 0˚C (32˚F) : 180.9kΩ 10˚C (50˚F) : 105.4kΩ 20˚C (68˚F) : 63.8kΩ 30˚C (86˚F) : 39.9kΩ 40˚C (104˚F) : 25.7kΩ 50˚C (122˚F) : 17.0kΩ 60˚C (140˚F) : 11.5kΩ 70˚C (158˚F) : 8.0kΩ 80˚C (176˚F) : 5.7kΩ 90˚C (194˚F) : 4.1kΩ 100˚C (212˚F) : 3.0kΩ	

	Name	Symbol (function)	Part code	Application	Specification	Check method
Indoor unit Outdoor unit	Solenoid valve	SV1 (discharge - suction by-pass)		1) High/low press. bypass at starting/ stopping and capacity control at low load 2) Discharge press. rise suppression	AC 220V Open at energizing and close at deenergizing	Continuity check by tester
		SV2 (discharge - suction by-pass)		Capacity control and high press. rise suppression (backup for frequency control)	AC 220V Open at energizing and close at deenergizing	
	Electronic expansion valve	SLEV		Adjustment of liquid refrigerant (oil) return foam accumulator	DC12V stepping motor drive Valve opening 0~480 pulse	
		LEV1 (SC coil)		Adjustment of bypass flow rate from outdoor unit liquid line at cooling		
	Liquid level detection heater	CH2, CH3 (accumulator liquid level detection)		Heating of refrigerant in accumulator liquid level detection circuit	Cord heater : 2.8kΩ (1.4kΩ+1.4kΩ) AC220V 20W (10W + 10W)	Resistance value check
	Electronic expansion valve	LEV		1) Adjust superheat of outdoor unit heat exchanger outlet at cooling. 2) Adjust subcool of indoor unit heat exchanger at heating.	DC12V Opening of stepping motor driving valve 60~2,000 pulses	Continuity check with tester for white-red-orange yellow-brown-blue
	Thermistor	TH21 (inlet air temperature)		Indoor unit control (thermostat)	R_0 = 15kΩ $B_{0/100}$ = 3460 Rt = $15\exp\{3460(\frac{1}{273+t}-\frac{1}{273})\}$ 0˚C (32˚F) : 15kΩ 10˚C (50˚F) : 9.7kΩ 20˚C (68˚F) : 6.4kΩ 25˚C (77˚F) : 5.3kΩ 30˚C (86˚F) : 4.3kΩ 40˚C (104˚F) : 3.1kΩ	Resistance value check
		TH22 (piping temperature)		1) Indoor unit control (freeze prevention, hot adjust, etc.) 2) LEV control in heating operation (Subcool detection)		
		TH23 (gas side piping temperature)		LEV control in cooling operation (Superheat detector)		

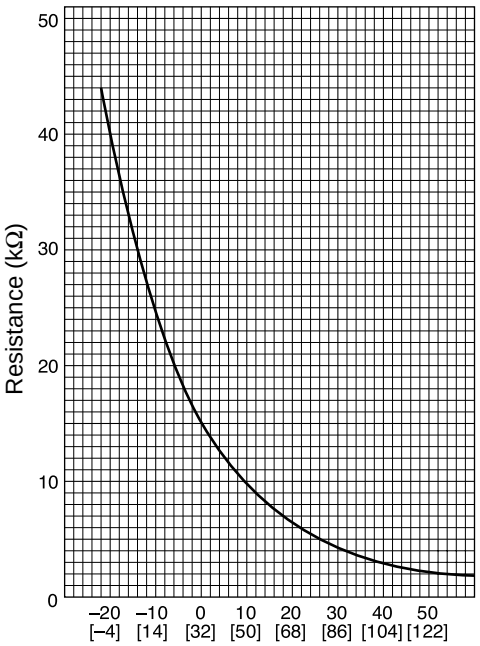
[4] Resistance of Temperature Sensor

Thermistor for low temperature

Thermistor R_0= 15kΩ ± 3% (TH5 ~ 8)

$R_t = 15\exp\{3460\,(\frac{1}{273+tc} - \frac{1}{273+0})\}$

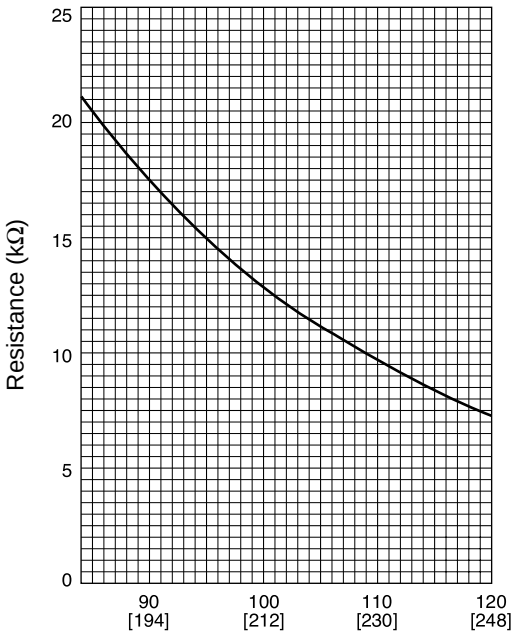
∗°F= $\frac{9}{5}\times$ °C + 32



Thermistor R_{120} = 7.465kΩ ± 2% (TH1)

$R_t = 7.465\exp\{4057\,(\frac{1}{273+tc} - \frac{1}{273+120})\}$

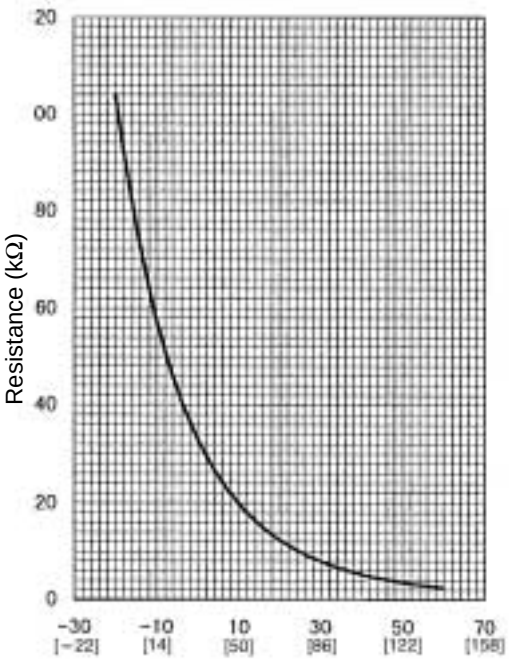
∗°F= $\frac{9}{5}\times$ °C + 32



Thermistor R_0 = 33kΩ ± 1% (TH2)

$R_t = 33\exp\{3965\,(\frac{1}{273+tc} - \frac{1}{273+0})\}$

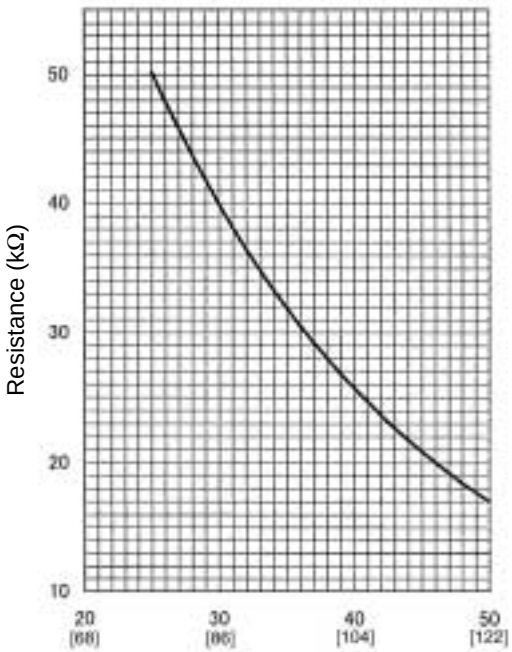
∗°F= $\frac{9}{5}\times$ °C + 32



Thermistor R_{50} = 17kΩ ± 2% (THHS)

$R_t = 17\exp\{4170\,(\frac{1}{273+tc} - \frac{1}{273+50})\}$

∗°F= $\frac{9}{5}\times$ °C + 32



5 REFRIGERANT AMOUNT ADJUSTMENT

Clarify relationship between the refrigerant amount and operating characteristics of CITY MULTI, and perform service activities such as decision and adjustment of refrigerant amount on the market.

[1] Refrigerant Amount and Operating Characteristics

The followings are refrigerant amount and operating characteristics which draw special attention.

1	During cooling operations, required refrigerant amount tends to increase (refrigerant in accumulator decreases) in proportion to increase in the number of operating indoor units. However, the change of increase rate is small.		
2	During heating operations, liquid level of accumulator is the highest when all the indoor units are operating.		
3	Discharge temperature hardly changes when increasing or decreasing refrigerant amount with accumulator filled with refrigerant.		
4	Tendency of discharge temperature	During cooling operations, discharge temperature tends to rise at overload than low temperature.	Comparison including control system
		During heating operations, discharge temperature tends to rise at low temperature than overload.	
		The lower the operating frequency is, the higher the discharge temperature tends to become of deteriorated compressor efficiency.	
5	Compressor shell temperature is 20~70 (36~126) degrees higher than low pressure saturation temperature (Te) when refrigerant amount is appropriate. → Judged as over replenishment when temperature difference from low pressure saturation temperature (Te) is 10 (18) degrees or less.		

Note : ˚C Scale (˚F Scale)

[2] Adjustment and Judgement of Refrigerant Amount

(1) Symptom

The symptoms shown in the table below are the signs of excess or lack of refrigerant amount. Be sure to adjust the amount of refrigerant in refrigerant amount adjustment mode, by checking operation status, judging refrigerant amount, and performing selfdiagnosis with LED Dip s/w 1, 1-10, for overall judgement of excess or lack of refrigerant amount.

1	Emergency stop at 1500 remote controller display (excessive refrigerant replenishment)	Excessive refrigerant replenishment
2	Operating frequency does not fully increase, thus resulting in insufficient capacity	Insufficient refrigerant replenishment
3	Emergency stop at 1102 remote controller display (discharge temperature trouble)	
4	Emergency stop occurs when the remote control display is at 1501. (insufficient refrigerant)	Insufficient refrigerant

(2) Refrigerant Volume Adjustment Operation

1) Operating Characteristics Refrigerant Volume

Characteristic items related to operating characteristics and the refrigerant volume are shown below.

1	If the number of indoor units in operation increases during cooling, the required volume of refrigerant tends to increase (the amount of refrigerant in the accumulator tends to decrease), but the change is minimal.		
2	The liquid level in the accumulator is at its highest when all the indoor units are operating during heating.		
3	If there is refrigerant in the accumulator, even if the volume of refrigerant is increased or decreased, there is practically no change in the outlet temperature.		
4	Tendency of discharge Temperature	During cooling, the discharge temperature rises more easily when there is an overload than when the temperature is low.	Comparison when control is included.
		During heating, the discharge temperature rises more easily when the temperature is low than when there is an overload.	
		The lower the operating frequency, the less efficient the compressor is, making it easier for the discharge temperature to rise.	
5	The compressor shell temperature becomes 20~70 (36~126) deg. higher than the low pressure saturation temperature (TH2) if the refrigerant volume is appropriate. If the difference with the low pressure saturation temperature (TH2) is 10 (18) deg. or less, it can be judged that the refrigerant is overcharged.		

Note : ˚C Scale (˚F Scale)

2) Adjusting and Judging the Refrigerant Volume

① Symptoms

Overcharging with refrigerant can be considered as the cause of the following symptoms. When adjusting the refrigerant volume, be sure that the unit is in the operating condition, and carry out refrigerant volume judgment and self-diagnosis by the LED's, judging overall whether the volume of refrigerant is in excess or is insufficient. Perform adjustments by running the unit in the refrigerant volume adjustment mode.

1	Emergency stop occurs when the remote control display is at 1500 (refrigerant overcharge).	Refrigerant overcharge
2	The operating frequency doesn't rise high enough and capacity is not achieved.	Insufficient refrigerant
3	Emergency stop occurs when the remote control display is at 1102 (outlet temperature overheating).	
4	Emergency stop occurs when the remote control display is at 1501 (insufficient refrigerant).	Insufficient refrigerant

② Refrigerant Volume

a Checking the Operating Condition

Operate all the indoor units on cooling or on heating, checking the discharge temperature, sub-cooling, low pressure saturation temperature, inlet temperature, shell bottom temperature, liquid level, liquid step, etc. and rendering an overall judgment.

	Condition	Judgement
1	Outlet temperature is high. (125°C (257˚F) or higher)	Refrigerant volume tends toward insufficient.
2	Low pressure saturation temperature is extremely low.	
3	Inlet superheating is high (if normal, SH = 20 (36) deg or lower).	
4	Shell bottom temperature is high (the difference with the low pressure saturation temperature is 70 (126) deg. or greater)	
5	Shell temperature is low (the difference with the low pressure saturation temperature is 10 (18) deg. or lower).	Rifrigerant volume tends toward overcharge.
6	Dischange superheating is low (if normal, SH = 20 (36) deg or higher).	

Note : ˚C Scale (˚F Scale)

b Check the refrigerant volume by self-diagnosis using the LED.
Set the self-diagnosis switch (SW1) as shown below and check the past information (history) concerning the refrigerant volume.

Set SW1 as shown in he figure at right. 

If LD8 lights up, it indicates the refrigerant charge abnormal delay state just before emergency stop due to refrigerant overcharge (1500).

③ Additional Refrigerant Charge Volume
At the time of shipping from the factory, the outdoor unit is charged with the amount of coolant shown in the following table, but since no extension piping is included, please carry out additional charging on-site.

Outdoor Unit Model Name	PUHY-80TMU-A	PUHY-100TMU-A
Refrigerant Charge Volume	6.5kg (14lb 6oz)	9kg (19lb 14oz)

Calculation Formula
Calculate the additional refrigerant volume by calculating the size of the extension liquid piping and its length units (m)[ft].

Additional Refrigerant Volume (kg) = $(0.12 \times L_1) + (0.06 \times L_2) + (0.024 \times L_3) + A$
[(oz) = $(1.29 \times L_1) + (0.65 \times L_2) + (0.26 \times L_3) + A$]

L_1: Length of ø12.7 (3/4") liquid pipe (m) [ft]
L_2: Length of ø9.52 (3/8") liquid pipe (m) [ft]
L_3: Length of ø6.35 (1/4") liquid pipe (m) [ft]
A: refer to the calculation table.

In the calculation results, round up fractions smaller than 0.01 kg. (Example: 18.54 kg → 18.6 kg)
1.0oz (653.97oz → 654oz)

(Calculation Table)

Total Capacity of Connected Indoor Units	A kg (oz)
~64	1.5 (53)
65~	2.0 (71)

3) Refrigerant Volume Adjustment Mode Operation

① Procedure

Depending on the operating conditions, it may be necessary either to charge with supplementary refrigerant, or to drain out some, but if such a case arises, please follow the procedure given below flow chart.

▽1 Switching the function select switch (SW2-4), located on the outdoor unit's control board, ON starts refrigerant volume adjustment mode operation and the following operation occurs. (Refrigerant recovery mode and oil recovery mode will be invalid.)

Operation	The outdoor unit LEV1 diverges more than usual during cooling operation.

▽2 Additionary, if the LED monitor display switch (SW1) on the outdoor unit's control board is set to the composition of refrigerant circulating in the refrigeration cycle (αOC).

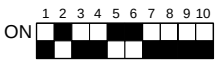
Note 1: Even if the refrigerant volume has reached a suitable level shortly after starting refrigerant volume adjustment mode, if left for a sufficient length of time (once the refrigeration system has stabilized), there are times when this level may become unsuitable.
1) The refrigerant volume is suitable.
When the refrigerant volume for TH5-TH7 is more than 5K at the outdoor unit, and 6 to 13K for SH at the indoor unit.
2) The current volume is suitable, however, may become unsuitable after a certain length of time.
When the refrigerant volume for TH5-TH7 is less than 5K at the outdoor unit, or less than 6K for SH at the indoor unit.

Note 2: There are times when it becomes difficult to determine the volume when performing refrigerant adjustments if the high pressure exceeds 1.37MPa.

Note 3: Based on the following flowchart, use TH1, TH5, TH7 and Tc to adjust the refrigerant volume. Use the self-diagnosis switch (SW1) on the outdoor unit main PCB to display TH1, TH5, TH7 and Tc.

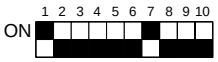
TH1 Self-diagnosis Switch

TH5 Self-diagnosis Switch



TH7 Self-diagnosis Switch

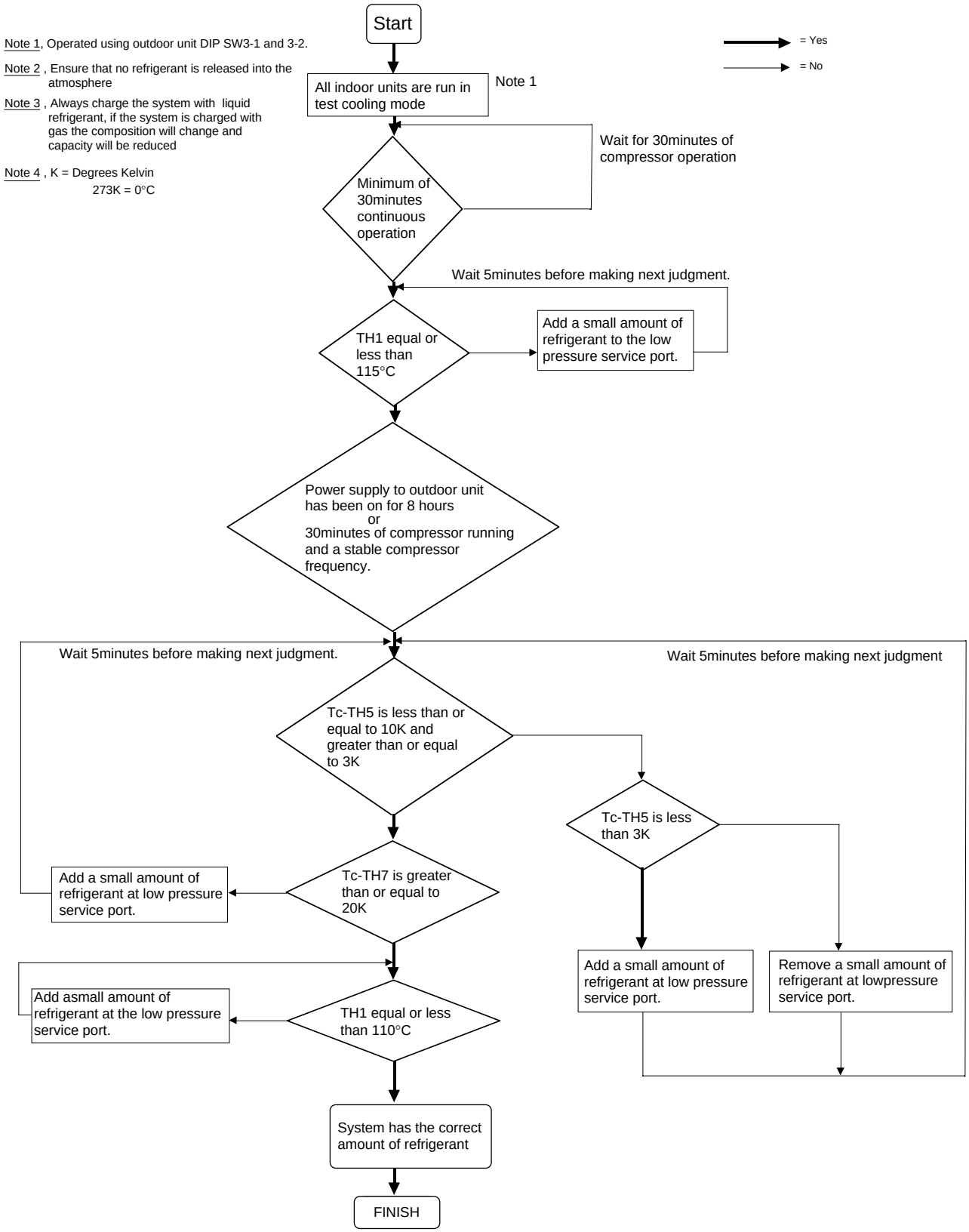
Tc Self-diagnosis Switch



Using these, judge TH1, Tc - TH5 and Tc - TH7.

Measure	A	When running refrigerant volume adjustment mode in the cooling operation, if note 2 above applies, determine the suitable refrigerant volume after waiting until outdoor units TH 5-7 reach more than 5K, and the indoor unit SH is in the range of 6 to 9K.
	C	Turn on the outdoor unit self-diagnosis switch and then monitor the LED for the indoor unit SH.

Refrigerant adjustment method



6 TROUBLESHOOTING

[1] Principal Parts

Pressure Sensor

(1) Judging Failure

1) Check for failure by comparing the sensing pressure according to the high pressure sensor and the pressure gauge pressure.
Turn on switches 1, 3, 5, 6 of the digital display select switch (SW1) as shown below, and the sensor pressure of the high pressure sensors is displayed digitally by the light emitting diode LD1.

High Pressure

1 In the stopped condition, compare the pressure readings from the gauge and from the LD1 display.
(a) If the gauge pressure is 0~0.098MPa (0~14.2 psi), the internal pressure is dropping due to gas leakage.
(b) If the pressure according to the LD1 display is 0~0.098MPa (0~14.2 psi), there is faulty contact at the connector, or it is disconnected. Proceed to 4.
(c) If the pressure according to the LD1 display is 3.14MPa (455 psi) or higher, proceed to 3.
(d) If other than (a), (b) or (c), compare the pressure readings during operation. Proceed to 2.

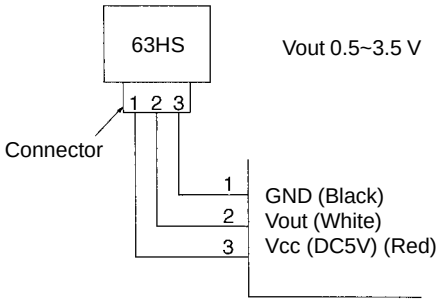
2 Compare the pressure readings from the gauge and from the LD1 display while in the running condition.
(a) If the difference between the two pressures is within 0.098MPa (14.2 psi), both the affected pressure sensor and the main MAIN board are normal.
(b) If the difference between the two pressures exceeds 0.098MPa (14.2 psi), the affected pressure sensor is faulty (deteriorating performance).
(c) If the pressure reading in the LD1 display does not change, the affected pressure sensor is faulty.

3 Disconnect the pressure sensor from the MAIN board and check the pressure according to the LD1 display.
(a) If the pressure is 0~0.098MPa (0~14.2 psi) on the LD1 display, the affected pressure sensor is faulty.
(b) If the pressure is 3.14MPa (455 psi) or higher, the MAIN board is faulty.

4 Disconnect the pressure sensor from the MAIN board and short out the No. 2 and No. 3 pins of the connector (63HS), then check the pressure by the LD1 display.
(a) If the pressure according to the LD1 display is 3.14MPa (455 psi) or higher, the affected pressure sensor is faulty.
(b) If other than (a), the MAIN board is faulty.

2) Pressure sensor configuration.
The pressure sensors are configured in the circuit shown in the figure at right. If DC 5 V is applied between the red and black wires, a voltage corresponding to the voltage between the white and black wires is output and this voltage is picked up by the microcomputer. Output voltages are as shown below.

High Pressure 0.1 V per 0.098MPa (14.2 psi)



*Connector connection specifications on the pressure sensor body side.
The connector's pin numbers on the pressure sensor body side differ from the pin numbers on the main circuit board side.

	Sensor Body Side	MAIN Board Side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1

Solenoid Valve (SV1, SV2)

Check if the control board's output signals and the operation of the solenoid valves match.
Setting the self-diagnosis switch (SW1) as shown in the figure below causes the ON signal of each relay to be output to the LED's.
Each LED shows whether the relays for the following parts are ON or OFF. When a LED lights up, it indicates that the relay is ON.

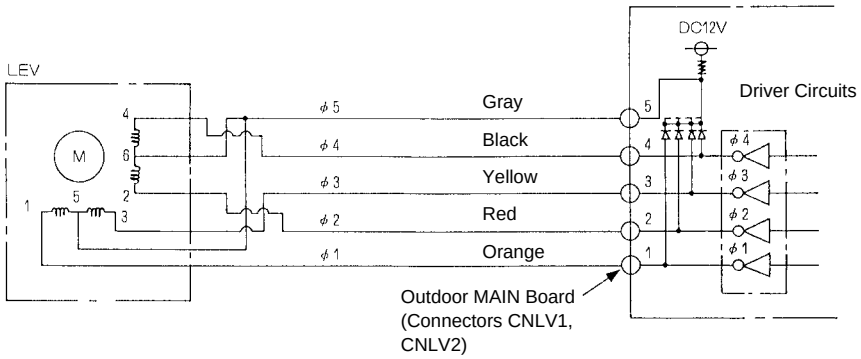
SW1	LED							
	1	2	3	4	5	6	7	8
	Compressor operating.	Crankcase Heater	21S4	SV1	SV2			Lights up all the time.
							CH 2, 3 Fluid Level Heater	

1) In the case of SV1 (Bypass Valve)
(a) When the compressor starts, SV1 is ON for 4 minutes, so check operation by whether the solenoid valve is emitting an operating noise.
(b) Changes in the operating condition by solenoid valve operation can be confirmed by the temperature of the bypass circuit and the sound of the refrigerant.

2) In the case of SV2 (Bypass)
(a) SV2 goes ON in accordance with the rise in the high pressure in the cooling mode and heating mode, so check its operation by the LED display and the operating noise emitted by the solenoid valve.
(b) Changes in the operating condition by solenoid valve operation can be confirmed by the temperature of the bypass circuit and the sound of the refrigerant.

Outdoor LEV

The valve opening angle changes in proportion to the number of pulses.
(Connections between the outdoor unit's MAIN board and SLEV, LEV1 (outdoor electronic expansion valve))



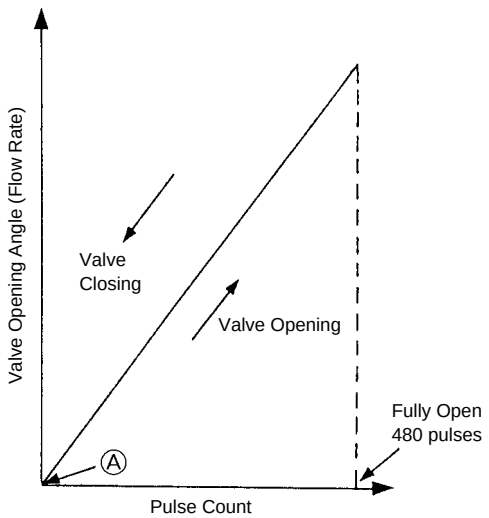
Pulse Signal Output and Valve Operation

Output (Phase) No.	Output State							
	1	2	3	4	5	6	7	8
ø1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
ø2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

Output pulses change in the following orders when the
Valve is Closed $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow 7 \rightarrow 8 \rightarrow 1$
Valve is Open $8 \rightarrow 7 \rightarrow 6 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 8$

*1. When the LEV opening angle does not change, all the output phases are off.
2. When the output is out of phase or remains ON continuously, the motor cannot run smoothly, but move jerkily and vibrates.

LEV Valve Closing and Valve Opening Operations



*When the power is switched ON, a 520 pulse valve opening signal is output to make sure the valve's position, so that it is definitely at point A. (The pulse signal is output for approximately 17 seconds.)

When the valve operates smoothly, there is no sound from the LEV and no vibration occurs, but when the valve is locked, it emits a noise.

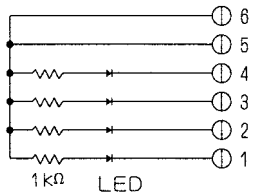
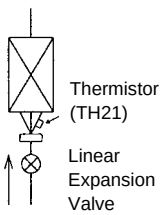
*Whether a sound is being emitted or not can be determined by holding a screwdriver, etc. against it, then placing your ear against the handle.

*If there is liquid refrigerant inside the LEV, the sound may become lower.

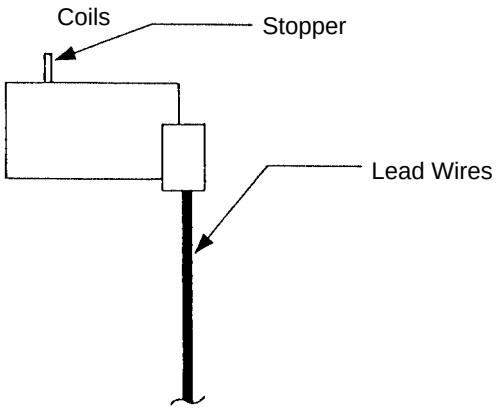
Judgment Methods and Likely Failure Mode

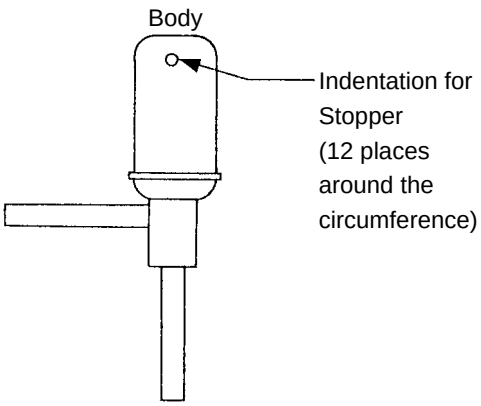
Caution:

The specifications of the outdoor unit (outdoor LEV) and outdoor units (indoor LEV) differ. For this reason, there are cases where the treatment contents differ, so follow the treatment specified for the appropriate LEV as indicated in the right column.

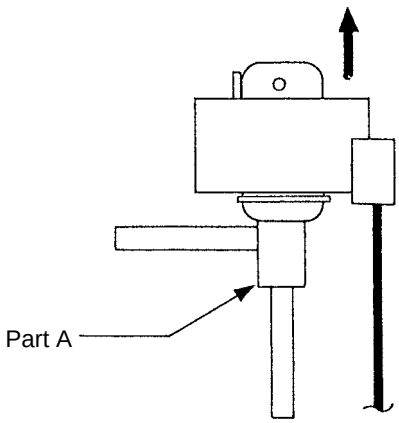
Failure Mode	Judgment Method	Treatment	Affected LEV
Microcomputer Driver Circuit Failure	Disconnect the control board connector and connect the check LED as shown in the figure below.  When the base power supply is turned on, the indoor LEV outputs pulse signals for 10 seconds. If the LED does not light up, or lights up and remains on, the driver circuit is abnormal.	In the case of driver circuit failure, replace the indoor unit's control board.	Indoor
LEV mechanism is locked.	If the LEV is locked up, the drive motor turns with no load and a small clicking sound is generated. Generation of this sound when the LEV is fully closed or fully open is abnormal.	Replace the LEV.	Indoor Outdoor
The LEV motor coils have a disconnected wire or is shorted.	Measure the resistance between the coils (red - white, red - orange, brown - yellow, brown - blue) using a tester. They are normal if the resistance is within 150Ω ± 10%.	Replace the LEV coils.	Indoor
	Measure the resistance between the coils (gray - orange, gray - red, gray - yellow, gray - black) using a tester. They are normal if the resistance is within 46Ω ± 3%.	Replace the LEV coils.	Outdoor
Fully Closed Failure (valve leaks)	If you are checking the indoor unit's LEV, operate the indoor unit in fan mode and at the same time operate other indoor units in the cooling mode, then check the piping temperatures (liquid pipe temperatures) of the indoor unit by the operation monitor through the outdoor unit controller board. When the fan is running, the linear expansion valve is fully closed, so if there is leakage, the temperature sensed by the thermistor (liquid pipe temperature sensor) will become low. If the temperature is considerably low compared to the remote control's intake temperature display, it can be judged that there is a fully closed failure. In the case of minimal leakage, it is not necessary to replace the LEV if there are no other effects. 	If there is a large amount of leakage, replace the LEV.	Indoor
Faulty wire connections in the connector or faulty contact.	① Check for pins not fully inserted on the connector and check the colors of the lead wires visually. ② Disconnect the control board's connector and conduct a continuity check using a tester.	Check the continuity at the places where trouble is found.	Indoor Outdoor

Outdoor LEV (SLEV, LEV1) Coil Removal Procedure (configuration)
As shown in the figure, the outdoor LEV is made in such a way that the coils and the body can be separated.

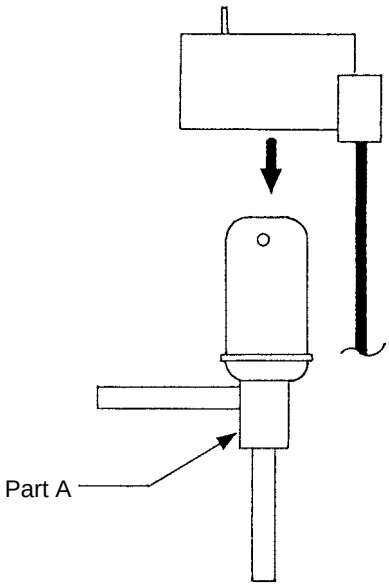




<Removing the Coils>
Fasten the body tightly at the bottom (Part A in the figure) so that the body will not move, then pull out the coils toward the top. If they catch on the stopper and are difficult to take out, turn the coils left and right until the stoppers are free from the stopper indentations, then pull the coils out.
If you take out the coils only without gripping the body, undue force will be applied to the piping and the pipe may be bent over, so be sure to fasten the body in such a way that it will not move.



<Installing the Coils>
Fasten the body tightly at the bottom (Part A in the figure) so that the body will not move, then insert the coils from the top, inserting the coils' stopper securely in one of the indentations on the body. (There are four indentations for the stopper on the body around its circumference, and it doesn't matter which indentation is used. However, be careful not to apply undue force to the lead wires or twist them around inside the body.) If the coils are inserted without gripping the body, it may exert undue force on the piping, causing it to become bent, so be sure to hold the body firmly so that it won't move when installing the coils.



Intelligent Power Module (IPM)

Measure resistances between each terminal of IPM with tester, and use the results for troubleshooting.

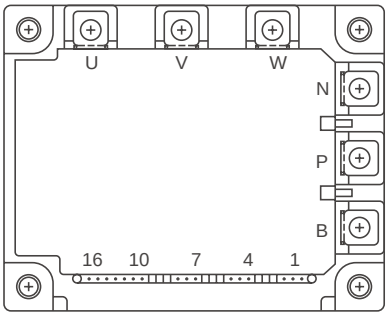
① Focus on whether there is a complete open (∞Ω) state or short-circuit (~0Ω).
The measured resistance value is a guideline and may deviate slightly.
Measure between several similar measurement points.
If the value does not differ by more than double or half from the other points, then judge the state as OK.

② Restrictions to applicable tester
Use a tester with an internal power of 1.5V or more.

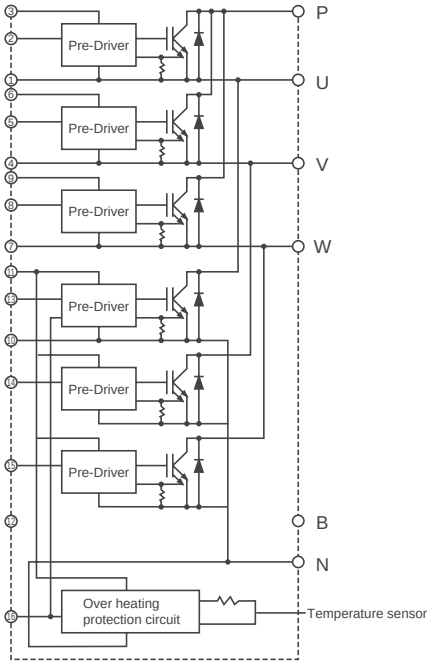
* Battery type tester
A card tester with button battery has a low applied voltage, so the resistance value of the diode characteristics cannot be measured correctly.
Use a measurement range that measures the low resistance when possible. An accurate measurement with less fluctuation will be possible.

The measured values for troubleshooting are shown in the table below.

• External view



• Internal circuit diagram

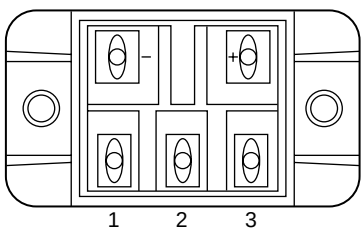


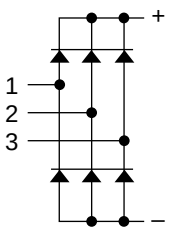
• Judged value

Tester Black / Tester Red	P	N	U	V	W
P			5~200Ω	5~200Ω	5~200Ω
N			∞	∞	∞
U	∞	5~200Ω			
V	∞	5~200Ω			
W	∞	5~200Ω			

Diode stack

Perform continuity check with tester. Judged as normal if the following characteristics are observed.
(Restrictions to applicable tester are the same as those of IPM)



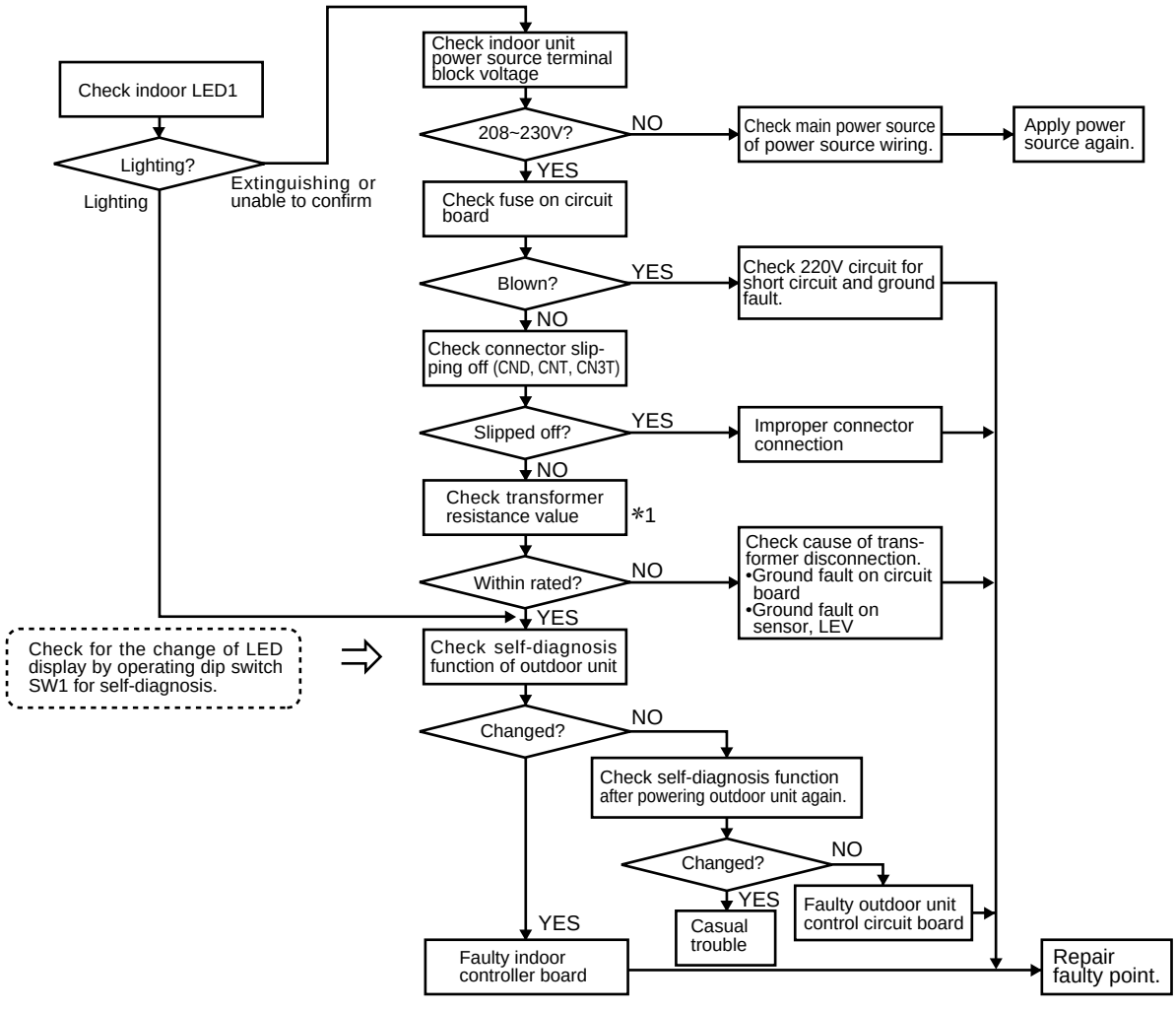


Tester Black / Tester Red	+	—	1	2	3
+			5~200Ω	5~200Ω	5~200Ω
—			∞	∞	∞
1	∞	5~200Ω			
2	∞	5~200Ω			
3	∞	5~200Ω			

(5) Trouble and remedy of remote controller

<table>
<tr><th></th><th>Symptom</th><th>Cause</th><th>Checking method & countermeasure</th></tr>
<tr><td>1</td><td>Despite pressing of remote controller switch, operation does not start with no electronic sound.

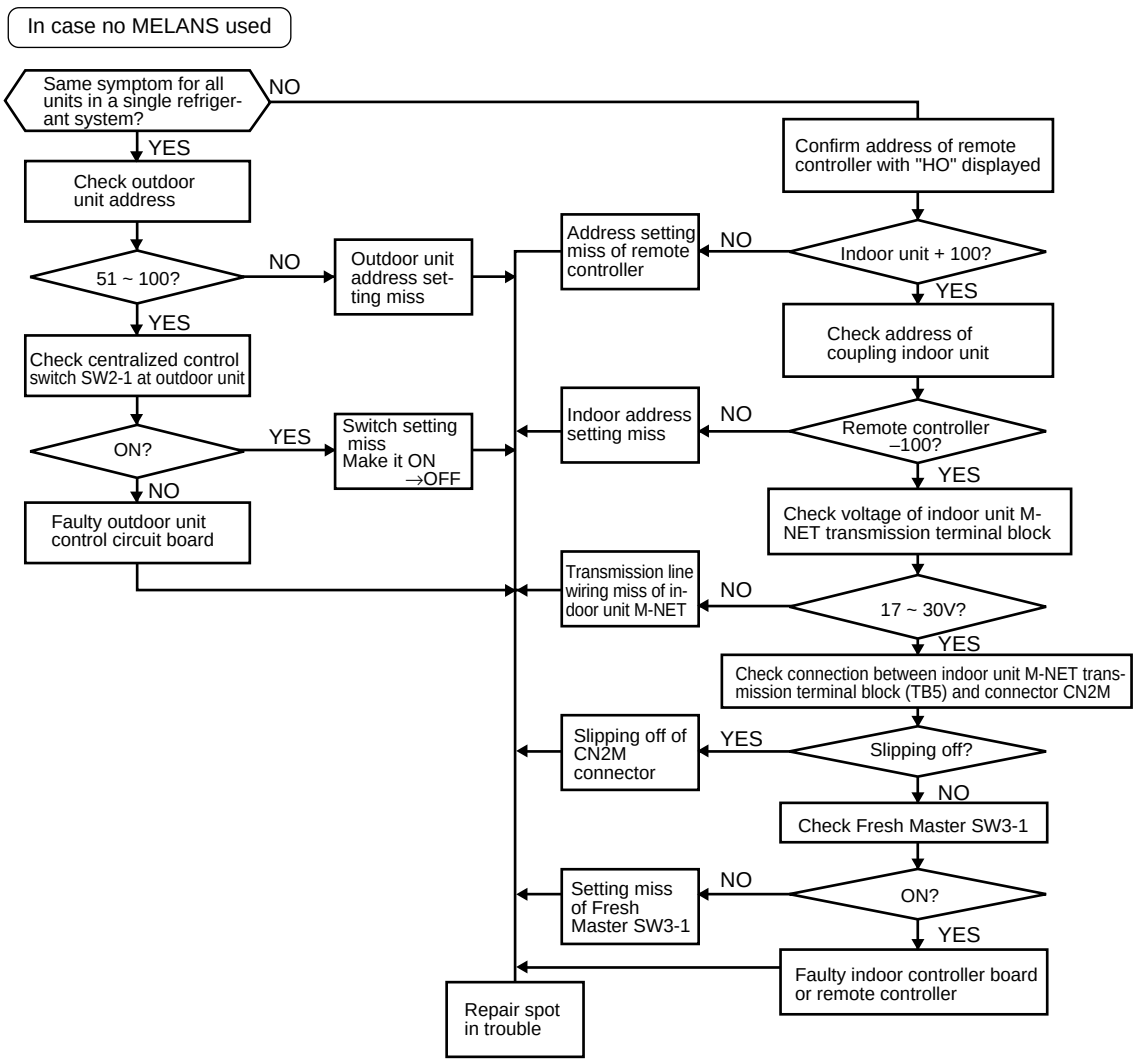
(No powering signal ◎ appears.)</td><td>1) M-NET transmission power source is not supplied from outdoor unit.
①Main power source of outdoor unit is not connected.
②Slipping off of connector on outdoor unit circuit board
Main board : CNS1, CNVCC3
INV board : CNDC2, CNVCC2, CNL2
G/A board : CNDC1
③Faulty power source circuit of outdoor unit
• Faulty INV board,
• Blown fuse (F01 on G/A board)
• Broken diode stack
• Broken resistor (R1) for rush current protection
2) Short circuit of transmission line
3) Erroneous wiring of M-NET transmission line at outdoor unit
①Transmission line disconnection or slipping off from terminal block
②Erroneous connection of indoor/outdoor transmission line to TB7
4) Slipping off of transmission wiring at remote controller
5) Faulty remote controller</td><td>a) Check transmission terminal block of remote controller for voltage.
i) In case of 17 ~ 30V
→ Faulty network remote controller
ii) In case of less than 17V
→ See “Transmission Power Circuit (30V) Check Procedure” on Page 54.

The cause of 2) and 3) is displayed with self-diagnosis LED for 7102 error.</td></tr>
<tr><td>2</td><td>At about 10 seconds after turning remote controller operation switch ON, the display distinguishes and the operation stops.</td><td>1) Power source is not fed to indoor unit from transformer.
①Main power source of indoor unit is not turned on.
②Slipping off of connector (CND, CNT, CN3T) on indoor controller board
③Blown fuse on indoor controller board
④Faulty or disconnected transformer of indoor unit
⑤Faulty indoor controller board</td><td></td></tr>
<tr><td></td><td></td><td>3) Faulty outdoor control circuit board or being out of control
As normal transmission is failed between indoor and outdoor units, outdoor unit model can not be recognized.</td><td></td></tr>
<tr><td></td><td colspan="3">Checking method & countermeasure
 

*1 Check the transformer in accordance with the “TROUBLE SHOOTING” in the indoor unit’s service handbook.</td></tr>
</table>

	Symptom	Cause
3	"HO" display on remote controller does not disappear and switch is ineffective.	(Without using MELANS) 1) Outdoor unit address is set to "00." 2) Erroneous address ①Address setting miss of indoor unit to be coupled with remote controller (Remote controller is not set to - 100.) ②Address setting miss of remote controller (Indoor unit is not set to + 100.) 3) Faulty wiring of transmission terminal block TB5 of indoor unit in the same group with remote controller 4) Centralized control SW2-1 of outdoor unit is turned ON. 5) Disconnection or faulty wiring of indoor unit transmission line 6) Disconnection between indoor unit M-NET transmission line terminal block (TB5) and connector CN2M 7) More than 2 sets of power supply connector (CN40) are inserted into centralized control transmission line of outdoor unit. 8) Faulty outdoor unit control circuit board 9) Faulty indoor controller board 10) Faulty remote controller --- (Interlocking control with MELANS) 11) No grouping registration from MELANS (Neglecting to set the relation between indoor unit and network remote controller) 12) Slipping off of centralized control transmission line (TB7) at outdoor unit 13) At system connected with MELANS, power supply connector (CN40) is inserted to centralized control transmission line of outdoor unit

Checking method & countermeasure



In case with MELANS used

When MELANS is used, "HO" display on the remote controller will disappear at the group registration of the indoor unit and local remote controller.
If "HO" does not disappear after the registration, check the items 12) ~ 14) in the Cause column.

	Symptom	Cause	Checking method & countermeasure
4	"88" appears on remote controller at the registration and access remote controller	[Generates at registration and confirmation] 1) Erroneous address of unit to be coupled 2) Slipping off of transmission line of unit to be coupled (No connection) 3) Faulty circuit board of unit to be coupled 4) Installation miss of transmission line	a) Confirm the address of unit to be coupled. b) Check the connection of transmission line. c) Check the transmission terminal block voltage of unit to be coupled i) Normal if voltage is DC17 ~ 30V ii) Check the item d) in case other than i).
		[Confirmation of different refrigerant system controller] 5) Breaking of power source of outdoor unit to be confirmed 6) Slipping off of centralized control transmission line (TB7) of outdoor unit 7) Power supply connector (CN40) is not inserted into centralized control transmission line in grouping with different refrigerant system without using MELANS 8) More than 2 sets of power supply connector are inserted into the centralized control transmission line of outdoor unit 9) In the system connected with MELANS, power supply connector (CN40) is inserted into the centralized control transmission line of outdoor unit. 10) Short circuit of centralized control transmission line	d) Confirm the power source of outdoor unit to be coupled with the unit to be confirmed e) Confirm that the centralized control transmission line (TB7) of outdoor unit is not slipped off. f) Confirm the voltage of centralized control transmission line. i) Normal in case of 10V ~ 30V ii) Check the items 7) ~ 10) left in case that other than i).

Transmission Power Circuit (30 V) Check Procedure

If " ◎ " is not displayed by the remote control, investigate the points of the trouble by the following procedure and correct it.

No.	Check Item	Judgment	Response
1	Disconnect the transmission line from TB3 and check the TB3 voltage.	DC24~30 V	Check the transmission line for the following, and correct any defects. Broken wire, short circuit, grounding, faulty contact.
		Except the above-mentioned	to No. 2
2	Check if the following connectors are disconnected in the outdoor unit's control box. MAIN Board: CNS1, CNVCC3 INV Board: CNVCC2, CNL2, CNDC2	Connector disconnected	Connect the connectors as shown on the electric wiring diagram plate.
		Except the above-mentioned	to No. 3
3	Disconnect the wires from CNVCC3 on the Main board and check the voltage between pins 1 and 3 on the wire side of the CNVCC3. Tester ⊕ ..... 1 pin Tester ⊖ ..... 3 pin	DC24~30 V	Check the wiring between CNS1 and TB3 for the following, and correct any defects. Broken wire, short circuit, grounding, faulty contact. If there is no trouble, replace the Main board.
		Except the above-mentioned	to No. 4
4	Disconnect the wiring from CNVCC2 on the INV board and check the voltage between pins 1 and 3 of CNVCC2. Tester ⊕ ..... 1 pin Tester ⊖ ..... 3 pin	DC24~30 V	Check the wiring between CNVCC2 and CNVCC3 for the following, and correct any defects. Broken wire, short circuit, grounding, faulty contact.
		Except the above-mentioned	to No. 5
5	Disconnect the wiring from CNL2 on the INV board, and check the resistance at both ends of choke coil L2.	0.5~2.5Ω	to No. 6
		Except the above-mentioned	Replace choke coil L2.
6	Check the voltage between pins 1 and 3 of CNDC2 on the INV board.	DC280~342 V	Replace the INV board.
		Except the above-mentioned	to No. 7
7	Check the resistance at both ends of F01 on the G/A board.	0 Ω	to No. 8
		Except the above-mentioned	Replace F01
8	Check the resistans at both ends of R1	20~24 Ω Except the above-mentioned	to No. 9 Replace R1
9	Chcke the DS	refer to "Judging Diode stack Failure" Except the above-mentioned	to No.10 Replace DS
10	Check the voltage between RS and T on power supply terminal block TB1.	AC187~253 V	Check the wiring to TB1 for the following and correct any defects. Broken wire, faulty contact.
		Except the above-mentioned	Check the power supply wiring and base power supply, and correct any defects.

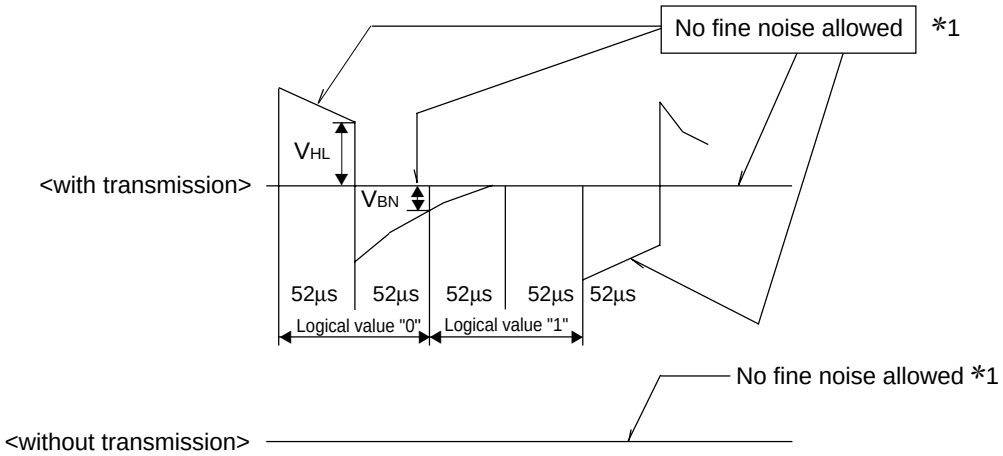
(6) Investigation of transmission wave shape/noise

Control is performed by exchanging signals between outdoor unit, indoor unit and remote controller by M-NET transmission. If noise should enter into the transmission line, the normal transmission will be hindered causing erroneous operation.

1) Symptom caused by the noise entered into transmission line

Cause	Erroneous operation	Error code
Noise entered into transmission line	Signal changes and is misjudged as the signal of other address.	6600
	Transmission wave shape changes to other signal due to noise.	6602
	Transmission wave shape changes due to noise, and can not be received normally thus providing no reply (ACK).	6607
	Transmission can not be made continuously due to the entry of fine noise.	6603
	Transmission can be made normally, but reply (ACK) or answer can not be issued normally due to noise.	6607 6608

2) Method to confirm wave shape



Check the wave shape of transmission line with an oscilloscope to confirm that the following conditions are being satisfied.

① The figure should be 104µs/bit ± 1%.
② No finer wave shape (noise) than the transmission signal (52µs ± 1%) should be allowed. *1
③ The sectional voltage level of transmission signal should be as follows.

Logical value	Transmission line voltage level
0	V_{HL} = 2.0V or more
1	V_{BN} = 1.3V or less

*1 However, minute noise from the DC-DC converter or inverter operation may be picked up.

3) Checking and measures to be taken

(a) Measures against noise

Check the items below when noise can be confirmed on wave shape or the error code in the item 1) is generated.

Items to be checked		Measures to be taken
Checking for wiring method	① Wiring of transmission and power lines in crossing	Isolate transmission line from power line (5cm or more). Never put them in a same conduit.
	② Wiring of transmission line with that of other system in bundle	Wire transmission line isolating from other transmission line. Wiring in bundle may cause erroneous operation like crosstalk.
	③ Use of shield wire for transmission line (for both indoor unit control and centralized control)	Use specified transmission wire. Type : Shield line CVVS/CPEVS Wire diameter : 1.25mm^2 or more
	④ Repeating of shield at the repeating of transmission line with indoor unit	The transmission line is wired with 2-jumper system. Wire the shield with jumper system as same for transmission line. When the jumper wiring is not applied to the shield, the effect against noise will be reduced.
	⑤ Are the unit and transmission lines grounded as instructed in the INSTALLATION MANUAL?	Connect to ground as shown in the INSTALLATION MANUAL.
Check for earthing	⑥ Earthing of the shield of transmission line (for indoor unit control) to outdoor unit	One point earthing should be made at outdoor unit. Without earthing, transmission signal may be changed as the noise on the transmission line has no way to escape.
	⑦ Arrangement for the shield of transmission line (for centralized control)	For the shield earth of the transmission line for centralized control, the effect of noise can be minimized if it is from one of the outdoor units in case of the group operation with different refrigerant systems, and from the upper rank controller in case the upper rank controller is used. However, the environment against noise such as the distance of transmission line, the number of connecting sets, the type of connecting controller, and the place of installation, is different for the wiring for centralized control. Therefore, the state of the work should be checked as follows. a) No earthing • Group operation with different refrigerant systems One point earthing at outdoor unit • Upper rank controller is used Earthing at the upper rank controller b) Error is generated even though one point earth is being connected. Earth shield at all outdoor units. Connect to ground as shown in the user's manual.

(b) When the wave height value of transmission wave shape is low, 6607 error is generated, or remote controller is under the state of "HO."

Items to be checked		Measures to be taken
	⑧ The farthest distance of transmission line is exceeding 200m.	Confirm that the farthest distance from outdoor unit to indoor unit/remote controller is less than 200m.
	⑨ The types of transmission lines are different.	Use the transmission wire specified. Type of transmission line : Shield wire CVVS/CPEVS Wire dia.of transmission line : 1.25mm^2 or more
	⑩ No transmission power (30 V) is being supplied to the indoor unit or the remote control.	Refer to "Transmission Power Supply (30 V) Circuit Check Procedure."
	⑪ Faulty indoor unit/remote controller	Replace outdoor unit circuit board or remote controller.

4) Treatment of Inverter and Compressor Troubles

If the compressor does not work when error codes 4240 or 4250 are detected, determine the point of malfunction by following the steps in the appropriate sections on the pages starting from page 75, then perform the procedures below.

No.	Check Item	Symptoms	Treatment
1	How many hours was the power kept on before operation?	① If it was kept on for 2 hours or longer as specified	Go to [2].
		② It was kept on for less than the specified period.	Go to [2] after keeping the power on for the specified time.
2	When it is restarted, does the trouble reappear?	① The inverter stops and the same error code is displayed.	Perform the check of wiring shown in the explanation of each error code.
3	Run the outdoor unit with the wiring to the compressor disconnected. At this time, change SW1-1 on the INV board to ON. Note) The terminals of the 3 disconnected wires should be isolated from each other.	① The compressor stops and the same error code is displayed.	Check the IPM is faulty. (Go to "Individual Parts Failure Judgment Methods.")
		② If the inverter's output voltage is output with good balance, *1	Check the coil resistance and insulation resistance of the compressor, and if it is normal, run it again, and if the trouble occurs again, replace the compressor. *Insulation resistance : 1MΩ or more Coil resistance : 0.11Ω(20˚C)
		③ If the balance in the inverter's output voltage is not good or if the inverter's output voltages are all 0 V (a digital tester cannot be used) *1	Check the IPM Judge that the IPM is faulty. (Go to "Individual Parts Failure Judgment Methods.") If the IPM is normal, replace the INV board, then perform this item again with SW1-1 ON. If the problem is solved and you connect the compressor again, turn SW1-1 OFF again. Check the compressor's coil resistance and insulation resistance. If the problem is not solved, replace the INV board.

***1 [Cautions when measuring the voltage and current of the inverter's power circuit.]**

Since the voltage and current on the inverter's power supply side and its output side do not have a sine waveform, the measurement values will differ depending on the measuring instrument and the circuit measured.
In particular, as the inverter's output voltage has a pulse waveform, the output frequency also changes, so differences in measurement values will be great depending on the measuring instrument.

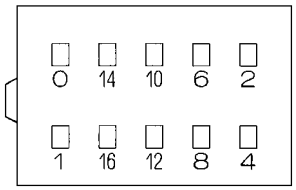
① When checking if the inverter's output voltage is unbalanced or not (relative comparison of the voltages between each of the lines), if you are testing with a portable tester, be sure to use an analog tester.
Use a tester of a type which can be used to judge if the IPM or diode module is faulty.
In particular, in cases where the inverter's output frequency is low, there are cases where the variations in measured voltage values between the different wires will be great when a portable digital tester is used, when in actuality they are virtually equal, and there is danger of judging that the inverter is faulty.

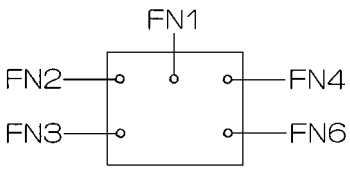
② It is recommended when checking the inverter's output voltage values (when measuring absolute values), that, if a measuring device for business frequencies is used, a rectified voltage meter (with a ⊣▶⊢ symbol) be used.
Correct measurement values cannot be obtained with an ordinary portable tester. (either analog or digital)

5) Troubleshooting at breaker tripping

Check items	Measures to be taken
1 Check the breaker capacity.	The breaker's capacity should be proper.
2 Check the a short circuit or grounding in the electrical system other than the inverter.	Correct any defects.
3 Check the resistance between terminals on the terminal block TB1 for power source. ① 0 ~ several ohms or improper megohm value	Check each part inside the inverter power circuit (resistance, megohm or the like). a) Diode stack Refer to "Troubleshooting of diode stack." b) IPM Refer to "Troubleshooting of IPM." c) Rush current protection resistor d) Electromagnetic contactor e) DC reactor * For c) ~ e), refer to "Individual Parts Failure Judgement Methods."
4 Checking by powering again. ① Main power source circuit breaker tripping ② No display of remote controller	
5 Operational check by operating air conditioner	
① Normal operation without breaker tripping.	a) As there is a possibility of instantaneous short circuit generated, find the mark of the short circuit for repair. b) When a) is not applicable, the compressor may be faulty.
② Breaker tripping	The ground fault of inverter output/compressor can be supposed. Disconnect the wiring to the compressor and check the insulation resistance of the following parts with a megger. a) Compressor terminals. b) Inverter output.

6) Individual Parts Failure Judgment Methods.

<table>
<tr><th>Part Name</th><th>Judgment Method</th></tr>
<tr><td>Diode Stack (DS)</td><td>Refer to “Judging Diode Stack Failure.” (P49)</td></tr>
<tr><td>Intelligent Power Module (IPM)</td><td>Refer to “Judging IPM Failure.” (P49)</td></tr>
<tr><td>Electromagnetic Contactor (52C)</td><td>Measure the resistance value at each terminal.
 

<table>
<tr><th>Check Location</th><th>Judgment Value</th></tr>
<tr><td>0-1</td><td>50~100kΩ</td></tr>
<tr><td>2-4 6-8
10-12 14-16</td><td>∞</td></tr>
</table></td></tr>
<tr><td rowspan="2">DC Reactor (DCL)</td><td>Measure the resistance between terminals: 1Ω or lower</td></tr>
<tr><td>Measure the resistance between the terminals and the chassis: ∞</td></tr>
<tr><td>Cooling Fan (MF1)</td><td>Measure the resistance between terminals: 0.1K~1.5KΩ</td></tr>
<tr><td>POWER board</td><td>Measure the resistance valve at between each terminal, and between each terminal and case.
 

<table>
<tr><th>Check Location</th><th>Judgment Value</th></tr>
<tr><td>FN 3-6, FN 2-4</td><td>Under 1Ω</td></tr>
<tr><td>FN 1-2, FN 2-3, FN4-6</td><td>∞</td></tr>
<tr><td>FN1, FN2, FN3, FN4, FN6-Case</td><td>∞</td></tr>
</table></td></tr>
</table>

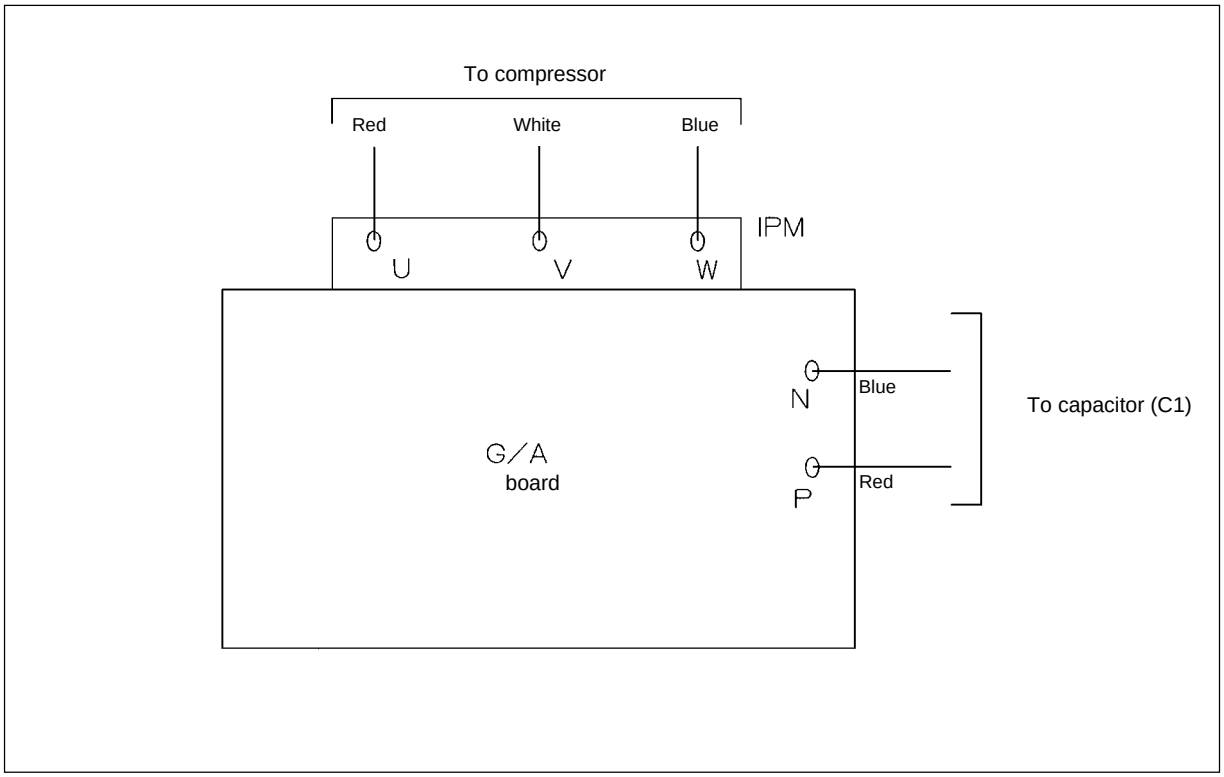
[Caution at replacement of inverter parts]

① The IPM and G/A board should be replaced together at the same time.
When the IPM is damaged, the G/A board may possibly be broken, and the use of the broken G/A board damages the normal IPM. Therefore, replace the IPM and G/A board together at the same time. However, if the G/A board is damaged, judge that the IPM is faulty, then judge whether replacement is necessary or not

② Fully check wiring for incorrect and loose connection.
The incorrect or loose connection of the power circuit part wiring like IPM and diode module causes to damage the IPM. Therefore, check the wiring fully. As the insufficient tightening of screws is difficult to find, tighten them together additionally after finishing other works. For the wiring of the base for IPM, observe the wiring diagram below carefully as it has many terminals.

③ Coat the grease for radiation provided uniformly onto the radiation surface of IPM/diode modules.
Coat the grease for radiation on the full surface in a thin layer, and fix the module securely with the screw for fastening.
As the radiation grease attached on the wiring terminal causes poor contact, wipe it off if attached.

Model PUHY-80TMU-A, 100TMU-A



Check Code List

Check Code		Check Content	
0403		Serial transmission trouble	
0900		Trial operation	
1102		Discharge temperature trouble	
1111		Low pressure saturation temperature sensor trouble (TH2)	
1302		High pressure trouble	
1500		Refrigerant volume charge trouble	
1505		Suction pressure trouble	
2500		Leakage (water) trouble	
2502		Drain pump trouble	
2503		Drain sensor trouble	
4102		Lacking power source error	
4103		Reverse phase error/Lacking power source error	
4115		Power supply sync signal trouble	
4116		Fan speed trouble (motor trouble)	
4200		VDC sensor/circuit trouble	
4220		Bus voltage trouble	
4230		Radiator panel overheat protection	
4240		Overcurrent protection	
4250	[1]	IPM Alarm output/Bus voltage abnormality	
	[11]	IAC sensor overcurrent abnormality	
4260		Cooling fan trouble	
5101		Thermal sensor trouble	Air inlet (TH21:IC)
			Discharge (TH1:OC)
5102			Liquid pipe (TH22:IC)
			Low pressure saturation (TH2:OC)
5103			Gas pipe (TH23:IC)
5105			Liquid pipe (TH5)
5106			Ambient temperature (TH6)
5107			SC coil outlet (TH7)
5108			SC coil bypass outlet (TH8)
5110			Radiator panel (THHS)
5201		Pressure sensor trouble	
5301	[6]	IAC sensor circuit/abnormality	
	[13]	IAC sensor miss-wiring abnormality	
6600		Multiple address error	
6602		Transmission processor hardware error	
6603		Transmission circuit bus-busy error	
6606		Communications with transmission processor error	
6607		No ACK error	
6608		No response error	
7100		Total capacity error	
7101		Capacity code error	

Check Code	Check Content
6606	Communications with transmission processor abnormality
6607	No ACK abnormality
6608	No response abnormality
6831	MA communication, No-reception error
6832	MA communication, Synchronization recovery error
6833	MA communication, Transmission/reception handware error
6834	MA communication, Start bit error
7100	Total capacity abnormality
7101	Capacity code abnormality
7102	Connected unit count over
7105	Address setting abnormality
7106	Characteristics setting abnormality
7111	Remote control sensor abnormality

Intermittent fault check code

Trouble Delay Cope		Trouble Delay Content
1202 (1102)		Preliminary discharge temperature abnormality or preliminary discharge thermal sensor abnormality (TH1)
1205		Preliminary liquid pipe temperature sensor abnormality (TH5)
1211 (1111)		Preliminary low pressure saturation abnormality or preliminary low pressure saturation sensor abnormality (TH2)
1214		Preliminary THHS sensor/circuit abnormality
1216		Preliminary sub-cool coil outlet thermal sensor abnormality (TH7)
1217		Preliminary sub-cool coil bypass outlet thermal sensor abnormality (TH8)
1221		Preliminary ambient temperature thermal sensor abnormality (TH6)
1402 (1302)		Preliminary high pressure abnormality or preliminary pressure sensor abnormality
1600 (1500)		Preliminary overcharged refrigerant abnormality
1601		Preliminary lacked refrigerant abnormality
1605 (1505)		Preliminary suction pressure abnormality
4300 (0403)	[9]	Preliminary serial transmission abnormality
4300 (5301)	[6]	IAC sensor/circuit abnormality
	[13]	IAC sensor miss-wiring abnormality
4310		Preliminary overcurrent breaking trouble
4320 (4220)		Preliminary bus voltage abnormality
4330 (4230)		Preliminary heat sink overheating abnormality
4340 (4240)		Preliminary overload protection
4350 (4250)	[1]	IPM Alarm output/Bus voltage abnormality
	[11]	IAC sensor overcurrent abnormality
4360 (4260)		Preliminary cooling fan abnormality

Please refer to ( ) : Check Code. [ ] : Error detail No.

[2] Self-diagnosis and Countermeasures Depending on the Check Code Displayed

(1) Mechanical

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
0403	Serial transmission trouble	If serial transmission cannot be established between the MAIN and INV boards	1) Wiring is defective.	Check 1, the connections, 2, contact at the connectors and 3, for broken wires in the following wiring. CNRS2 - CNRS3 CNAC2 - TB1A
			2) Switches are set wrong on the INV board.	SW1-4 on the INV board should be OFF.
			3) A fuse (F01) on the INV board is defective.	If the fuse is melted, (if the resistance between the both ends of fuse is ∞), replace the fuse.
			4) The circuit board is defective.	If none of the items in 1) to 3) is applicable, and if the trouble reappears even after the power is switched on again, replace the circuit board by the following procedure (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely). ① If serial transmission is restored after the INV board only is replaced, then the INV board is defective. ② If serial transmission is not restored, reinstall the INV board and replace the MAIN board. If serial transmission is restored, the MAIN board is defective. ③ If serial transmission is not restored by ① and ② above, replace both boards.
1102	Discharge temperature trouble (Outdoor unit)	1. When 140°C or more discharge temperature is detected during op-erations (the first time), outdoor unit stops once, mode is changed to restart mode after 3 minutes, then the outdoor unit restarts. 2. When 140°C or more temp. is detected again (the second time) within 30 minutes after stop of outdoor unit, error stop is observed with code No. "1102" displayed. 3. When 140°C or more temp. is detected 30 or more minutes after stop of outdoor unit, the stop is regarded as the first time and the process shown in 1 is observed. 4. 30 minutes after stop of outdoor unit is intermittent fault check period with LED displayed(1202).	1) Gas leak, gas shortage	See **Refrigerant amount check**.
			2) Overload operations	Check operating conditions and operation status of indoor/outdoor units.
			3) Poor operations of indoor LEV 4) Poor operations of OC controller LEV Cooling : LEV1	Check operation status by actually performing cooling or heating operations. Cooling : Indoor LEV LEV1 Heating : Indoor LEV See **Trouble check of LEV and solenoid valve**.
			5) Poor operations of ball valve	Confirm that ball valve is fully opened.
			6) Outdoor unit fan block, motor trouble, poor operations of fan controller→Heating [3) ~ 6) : Rise in discharge temp. by low pressure drawing]	Check outdoor fan. See **Trouble check of outdoor fan**.
			7) Gas leak between low and high pressures [4-way valve trouble, compressor trouble, solenoid valve SV1 trouble]	Check operation status of cooling or heating.
			8) Poor operations of solenoid valve SV2 [Bypass valve SV2 can not control rise in discharge temp.]	See **Trouble check of solenoid valve**.
			9) Thermistor trouble	Check resistance of thermistor
			10) Thermistor input circuit trouble on control circuit board	Check inlet temperature of sensor with LED monitor.

Checking code			Meaning, detecting method	Cause	Checking method & Countermeasure
1111	Low pressure saturation temperature trouble	Low pressure saturation temperature sensor trouble (TH2)	1. When saturation temperature sensor (TH2) detects –40°C or less (the first time) during operations, outdoor unit stops once, mode is changed to restart mode after 3 minutes, then the outdoor unit restarts. 2. When –40°C or less temp. is detected again (the second time) within 30 minutes after stop of outdoor unit, error stop is observed with code Nos. "1111" or displayed. 3. When –40°C or less temperature is detected 30 or more minutes after stop of outdoor unit, the stop is regarded as the first time and the process shown in 1. is observed. 4. 30 minutes after stop of outdoor unit is intermittent fault check period with LED displayed. Note: 1. Low press. saturation temperature trouble is not detected for 3 minutes after compressor start, and finish of defrosting operations, and during defrosting operations. 2.In the case of short/open of TH2 sensors before starting of compressor or within 10 minutes after starting of compressor, "1111" is displayed too.	1) Gas leak, Gas shortage	See **Refrigerant amount check**.
				2) Insufficient load operations	Check operating conditions and operation status of outdoor unit.
				3) Poor operations of indoor LEV 4) Poor operations of OC controller LEV1. Cooling : LEV1	Check operation status by actually performing cooling or heating operations. Cooling : indoor LEV LEV1 Heating : indoor LEV See **Trouble check of LEV and solenoid valve**.
				5) Poor operations of ball valve	Confirm that ball valve is fully opened.
				6) Short cycle of indoor unit 7) Clogging of indoor unit filter 8) Fall in air volume caused by dust on indoor unit fan 9) Dust on indoor unit heat exchanger 10)Indoor unit block, Motor trouble 5)~10) : Fall in low press. caused by lowered evaporating capacity in cooling operation.	Check indoor unit, and take measures to troube
				11) Short cycle of outdoor unit 12) Dust on outdoor heat exchanger	Check outdoor unit, and take measures to trouble
				13) Indoor unit fan block, motor trouble, and poor operations of fan controller [10)~12) : Fall in low press. caused by lowered evaporating capacity in heating operation.]	Check outdoor unit fan. See **Trouble check of outdoor unit fan**.
				14) Poor operations of solenoid valve SV2 [Bypass valve (SV2) can not control low pressure drop.]	See **Trouble check of solenoid valve**.
				15) Thermistor trouble (TH2~TH6)	Check resistance of thermistor
				16) Pressure sensor trouble	See **Trouble check of pressure sensor**.
				17) Control circuit board thermistor trouble and pressure sensor input circuit trouble	Check inlet temp. and press. of sensor by LED monitor.
				18) Poor mounting of thermistor (TH2~TH6)	

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
1302	High pressure trouble 1 (Outdoor unit)	1. When press. sensor detects 28kg/cm^2 or more during operations (the first time), outdoor unit stops once, mode is changed to restart mode after 3 minutes, then the outdoor unit restarts. 2. When 30kg/cm^2 or more pres- sure is detected again (the second time) within 30 minutes after stop of outdoor unit,error stop is observed with code No. "1302" displayed. 3. When 28kg/cm^2 or more pres-sure is detected 30 or more minutes after stop of outdoor unit, the detection is regarded as the first time and the process shown in 1 is observed. 4. 30 minutes after stop of outdoor unit is intermittent fault check period with LED displayed. 5. Error stop is observed immediately when press. switch ($30\ ^{+0}_{-1.5}$ kg/cm^2) operates in addition to pressure sensor.	1) Poor operations of indoor LEV	Check operations status by actually performing cooling or heating operations. Cooling : Indoor LEV LEV1 Heating : Indoor LEV See **Trouble check of LEV and solenoid valve**.
			2) Poor operations of ball valve	Confirm that ball valve is fully opened.
			3) Short cycle of indoor unit 4) Clogging of indoor unit filter 5) Fall in air volume caused by dust on indoor unit fan 6) Dust on indoor unit heat exchanger 7) Indoor unit fan block, motor trouble [2)~7) : Rise in high pressure caused by lowered condensing capacity in heating operation]	Check indoor unit and take measures to trouble.
			8) Short cycle of outdoor unit 9) Dust on outdoor unit heat exchanger	Check outdoor unit and take measures to trouble.
			10) Outdoor unit fan block, motor trouble, poor operations of fan controller [8)~10) : Rise in high press. caused by lowered condensing capacity in cooling operation]	Check outdoor unit fan See **Trouble check of outdoor unit fan.**
			11)Poor operations of solenoid valves SV1, 2 (Bypass valves (SV1, 2) can not control rise in high pressure)	See **Trouble check of solenoid valve**.
			12)Thermistor trouble (TH2, TH5, TH6)	Check resistance of thermistor.
			13) Pressure sensor trouble	Check **Trouble check of pressure sensor**.

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
1302	High pressure trouble 1 (Outdoor unit)		16) Control circuit board thermistor trouble, press. sensor input circuit trouble	Check inlet temperature and press. of sensor with LED monitor.
			17) Poor mounting of thermistor (TH2, TH5, H6) 18) Coming loose the connecter of pressure switch or cut of the wire.	
	High pressure trouble 2 (Outdoor unit)	When press. sensor detects 1kg/cm^2 or less just before starting of operation, erro stop is observed with code No. "1302" displayed.	1) Fall in internal press. caused by gas leak 2) Press. sensor trouble 3) Film breakage 4) Coming off of pin in connector portion, poor contact 5) Broken wire 6) Press. sensor input circuit trouble on control circuit board	See **Trouble check of pressure sensor**.
1500	Overcharged refrigerant abnormality	1. If the discharge SH≦10K is detected during operation (at first detection), the outdoor unit stops at once. The 3-minute restart prevention mode is entered. After three minutes, the outdoor unit starts up again. 2. If the discharge SH≦10K is detected again within 30 minutes after the outdoor unit stops (second detection), an abnormal stop is applied, and "1500" is displayed. 3. If discharge SH≦10K is detected more than 30 minutes after the outdoor unit stops, the state is the same as the first detection and the same operation as 1 above takes place. 4. The abnormal stop delay period is in effect for 30 minutes after the outdoor unit stops. The abnormal stop delay period LED turns ON during this time. 5. If the abnormality detection prohibit switch (SW2-4) is ON, the same operation as the first detection will apply for the second and following detections.	1) Excessive refrigerant charge.	Refer to the section on judging the refrigerant volume.
			2) Main circuit board thermistor input circuit trouble	Check the sensor detection temperature and pressure with the LED monitor.
			3) Thermistor mounting trouble (TH1, TH2)	
1505	Suction pressure trouble	<Condition 1> 1. Judging that the state when the suction pressure reaches 0kg/cm^{2}G during compressor operation indicates high pressure by the discharge temperature and low pressure saturation temperature, the back-up control by gas bypassing will be conducted. 2. The outdoor unit once stops entering into the 3-minutes restart mode if the state of 1 continues for 3 minutes, and restarts after 3 minutes. 3. After restarting, if the same state as 1 continues within 30 minutes from the stopping of 2, error stop will be commenced displaying “1505”. 4. Ineffective if the compressor operating time (integrated) exceeds 60-minutes not detecting trouble.	• Operation while neglecting to open ball valve. Especially for the ball valve at low pressure side. At cooling : Gas side ball valve At heating : Liquid side ball valve • When plural systems are existing, the low pressure abruptly drop at indoor stopping by the erroneous wiring of transmission line (different connection of transmission line and refrigerant piping). • Temporary vacuum condition due to refrigerant distribution unbalance (insufficient refrigerant of low pressure line) immediately after charging refrigerant.	Once vacuum operation protection is commenced, do not attempt to restart until taking the measures below. <Checking method> • Check ball valve for neglecting to open. • Check extended piping for clogging when ball valve is opened. • Check transmission line for erroneous wiring. (Confirm the correct wiring and piping connection between indoor and outdoor units by operating indoor unit one by one.) <Countermeasure> • After checking with the above method, make error reset by power source reset. • Then operate for 10~15-minutes under the operation mode reverse to that when the vacuum operation protection occurred (Heating if error occurred in cooling, while cooling if it occurred in heating), and then enter into the ordinary operation state.

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
2500	Leakage (water) trouble	When drain sensor detects flooding during drain pump OFF.	1) Water leak due to humidifier or the like in trouble.	Check water leaking of humidifier and clogging of drain pan.
2502	Drain pump trouble	The drain sensor's water drain* and after the drain pump is turn on for more than three minuites. *Drain sensor's water drain condition when indirect heater of drain after 40 second's. • Rise in temperature of drain sensor is 20 deg or less or • The temperature of the drain sensor is 63°C or less.	1) Drain sensor sinks in water because drain water level rises due to drain water lifting-up mechanism trouble.	Check operations of drain pump.
			2) Broken wire of indirect heater of drain sensor	Measure resistance of indirect heater of drain sensor. (Normal: Approx. 82Ω between 1–3 of CN50)
			3) Detecting circuit (circuit board) trouble Indoor LEV operation is faulty. 4) The trable of indoor LEV	Indoor board trouble if no other problems is detected. Operate in fan mode checking to make sure that the temperature of TH2 and TH3 rise to the around the same level.
2503	Drain sensor trouble	Short/open is detected during drain pump operations. (Not detected when drain pump is not operating.) Short : 90°C or more detected Open : –40°C or less detected	1) Thermistor trouble 2) Poor contact of connector (insufficient insertion) 3) Full-broken of half-broken thermistor wire	Check resistance of thermistor 0℃ : 15kΩ 10℃ : 9.7kΩ 20℃ : 6.4kΩ 30℃ : 4.3kΩ 40℃ : 3.1kΩ
			4) Indoor unit circuit board (detecting circuit) trouble	Check contact of connector Indoor port trouble if no other problem is detected.
2600	Water leak trouble	—	Water leak from piping of humidifier	Confirm water leaking section.
2601	Water suspension trouble	—	1) Water is not supplied to water tank for humidifying. 2) The solenoid valve for humidifying is set to OFF. 3) Disconnection of float switch. 4) Faulty operation of float switch. 5) Freezing of water tank.	Confirm supply water volume. Solenoid valve and connection Confirm connector section. Confirm connecting section. Faulty float switch. Turn power source OFF once, and turn ON after thawaing.
	Operation of float switch	When Float switch operates (point of contact : OFF), error stop is observed with code No. "2503" displayed.	1) Drain up input trouble 2) Poor contact of float switch circuit 3) Float switch trouble	Check drain pump operations Check connect contact. Check float switch operations.

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4102	Open phase error	Open phase in the power system is being detected, so operation cannot be started.	1) Open phase has occurred in the power supply (R, S, T).	Check before the breaker, after the breaker or at the power supply terminal blocks TB1, and if there is an open phase, correct the connections. a) Check if a wire is disconnected. b) Check the voltage between each of the wires.
			2) The wiring is faulty.	Check 1 the connections, 2, the contact at the connector, 3, the tightening torque at screw tightening locations and 4 for wiring disconnections. TB1~EN20 Refer to the circuit number and the wiring diagram plate.
			3) The fuse is faulty.	If F1, F2 or F3 on the MAIN board is melted, (Resistance between both ends of the fuse is ∞), replace the fuses.
			4) The circuit board is faulty.	If none of the items in 1) to 4) is applicable, and if the trouble reappears even after the power is switched on again, replace the MAIN board (when replacing the circuit board, be sure to connect all the connectors, etc. securely).
4103	Reverse phase error	Reverse phase (or open phase) in the power system is being detected, so operation cannot be started.	1) The phases of the power supply (R, S, T) have been reversed.	If there is reverse phase before the breaker, after the breaker or at the power supply terminal blocks TB1, reconnect the wiring.
			2) Open phase has occurred in the power supply (R, S, T).	Check before the breaker, after the breaker or at the power supply terminal blocks TB1, and if there is an open phase, correct the connections. a) Check if a wire is disconnected. b) Check the voltage between each of the wires.
			3) The wiring is faulty.	Check 1 the connections, 2, the contact at the connector, 3, the tightening torque at screw tightening locations and 4 for wiring disconnections. TB1~EN20 Refer to the circuit number and the wiring diagram plate.
			4) The fuse is faulty.	If F1 or F2 or F3 on the MAIN board is melted, (Resistance between both ends of the fuse is ∞), replace the fuses.
			5) The circuit board is faulty.	If none of the items in 1) to 4) is applicable, and if the trouble reappears even after the power is switched on again, replace the MAIN board (when replacing the circuit board, be sure to connect all the connectors, etc. securely).

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4115	Power supply sync signal trouble	The frequency cannot be determined when the power is switched on. (The power supply's frequency cannot be detected. The outdoor fan cannot be controlled by phase control.)	1) There is an open phase in the power supply (R, S, T)	Check before the breaker, after the breaker or at the power supply terminal blocks TB1 or TB1A, and if there is an open phase, correct the connections.
			2) The power supply voltage is distorted.	If the power supply voltage waveform is distorted from a sine wave, improve the power supply environment.
			3) A fuse is defective.	If F1, F2 or F3 on the MAIN board, or F3 is melted, (Resistance between both ends of the fuse is ∞), replace the fuses.
			4) The circuit board is defective.	If none of the items in 1) to 3) is applicable, and if the trouble reappears even after the power is switched on again, replace the MAIN board (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely).
4116	Fan speed trouble (motor trouble)	(Detects only for PKFY-NAM) 1. Detecting fan speed below 180rpm or over 2000rpm during fan operation at indoor unit (first detection) enters into the 3-minute restart prevention mode to stop fan for 30 seconds. 2. When detecting fan speed below 180rpm or over 2000rpm again at fan returning after 30 seconsd from fan stopping, error stop (fan also stops) will be commenced displaying 4116.	1) Slipping off of fan speed detecting connector (CN33) of indoor controller board	• Confirm slipping off of connector (CN33) on indoor controller board.
			2) Slipping off of fan output connector (FAN1) of indoor power board	• Confirm slipping off of connector (FAN1) on indoor power board.
			3) Disconnection of fan speed detecting connector (CN33) of indoor controller board, or that of fan output connector (FAN1) of indoor powr board.	• Check wiring for disconnection.
			4) Filter cologging	• Check filter.
			5) Trouble of indoor fan motor	• Check indoor fan motor.
			6) Faulty fan speed detecting circuit of indoor controller board, or faulty fan output circuit of indoor power board.	• When aboves have no trouble. 1) For trouble after operating fan. Replace indoor controller board. If not remedied, replace indoor power board. 2) For trouble without operating fan. Replace indoor power board.

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4200	VDCsensor/ circuit trouble	① If VDC ≦ 150 V is detected just before the inverter starts. ② If VDC ≧ 400 V is detected just before the inverter starts. ③ If the voltage of the INV board's sensor circuit input is what it should not normally be.	1) Power supply voltage is abnormal.	• Check if an instantaneous power failure or power failure, etc. has occurred. • Check if the voltage is the rated voltage value.
			2) The wiring is defective.	Check 1, the connections, 2, contact at the connectors, 3 tightening torque at screw tightened portions, 4, wiring polarities, 5, for broken wires, and 6, for grounding in the following wiring. TB1 ~ DS ~ POWER Board ~ 52C ~ R1 ~ DCL~C1 ~ IPM ~ G/A Board (F1) ~ CNDC1 ~ CNDC2 wiring * Check if the wiring polarities are as shown on the electric wiring diagram plate.
			3) The rush current prevention resistors (R1) are defective.	To judge failure of R1, go to "Individual Parts Failure Judgment Methods."
			4) The electromagnetic contactor (52C) is defective.	To judge failure of the 52C, go to "Individual Parts Failure Judgment Methods."
			5) The diode stack (DS) is defective.	To judge failure of the DS, go to "Individual Parts Failure Judgment Methods."
			6) The reactor (DCL) is defective.	To judge failure of the DCL, go to "Individual Parts Failure Judgment Methods."
			7) The INV board is defective.	If none of the items in 1) to 6) is applicable, and if the trouble reappears even after the power is switched on again, replace the INV board, (when replacing the circuit board, be sure to connect all the connectors, etc. securely)

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4220	Bus voltage trouble	If VDC ≦ 220 V is detected during inverter operation.	1) The power supply voltage is abnormal.	• Check if an instantaneous stop or power failure, etc. has occurred. • Check if the voltage is the rated voltage value.
			2) The wiring is defective.	Check 1, the connections, 2, contact at the connectors, 3 tightening torque at screw tightened portions, 4, wiring polarities, 5, for broken wires, and 6, for grounding in the following wiring. TB1 ~ DS ~ Power Board ~ 52C ~ R1 ~ DCL ~ C1 ~IPM ~ G/A Board (F1) ~ CNDC1 ~ CNDC2 Wiring CN15V1 ~ CN15V2 Wiring CNDR1 ~ CNDR2 Wiring *Check if the wiring polarities are as shown on the wiring diagram plate.
			3) The rush current prevention resistors (R1) are defective.	To judge failure of R1, go to "Individual Parts Failure Judgment Methods."
			4) The electromagnetic contactor (52C) is defective.	To judge failure of the 52C, go to "Individual Parts Failure Judgment Methods."
			5) The diode stack (DS) is defective.	To judge failure of the DS, go to "Individual Parts Failure Judgment Methods."
			6) The reactor (DCL) is defective.	To judge failure of the DCL, go to "Individual Parts Failure Judgment Methods."
			7) The inverter output is grounded.	• Check the wiring between the IPM and the compressor. • Check the compressor's insulation resistance.
			8) The capacitor (C1) is defective	Check the capacity of C1. (If C1≦3700 μF is defective)
			9) The circuit board is defective.	If none of the items in 1) to 8) is applicable, and if the trouble reappears even after the power is switched on again, replace the INV board (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely).
4230	Radiator panel overheat protection	If the cooling fan stays ON for 5 minutes or longer during inverter operation, and if THHS ≧ 92 °C is detected.	1) The wiring is defective.	Check 1 connections, 2 contact at the connectors and 3 for broken wires in the following wiring. MF1~CNFAN
			2) The INV board fuse (F01) is defective.	If the fuse is defective, replace the fuse.
			3) The cooling fan (MF1) is defective.	To judge failure of the MF1, go to "Individual Parts Failure Judgment Methods."
			4) The THHS sensor is defective.	To judge failure of the THHS, go to error code "5110".
			5) The air passage is clogged.	If the air passage of the heat sink is clogged, clear the air passage.
			6) The INV board is defective.	If none of the items in 1) to 5) is applicable, and if the trouble reappears even after the power is switched on again, replace the INV board (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely).

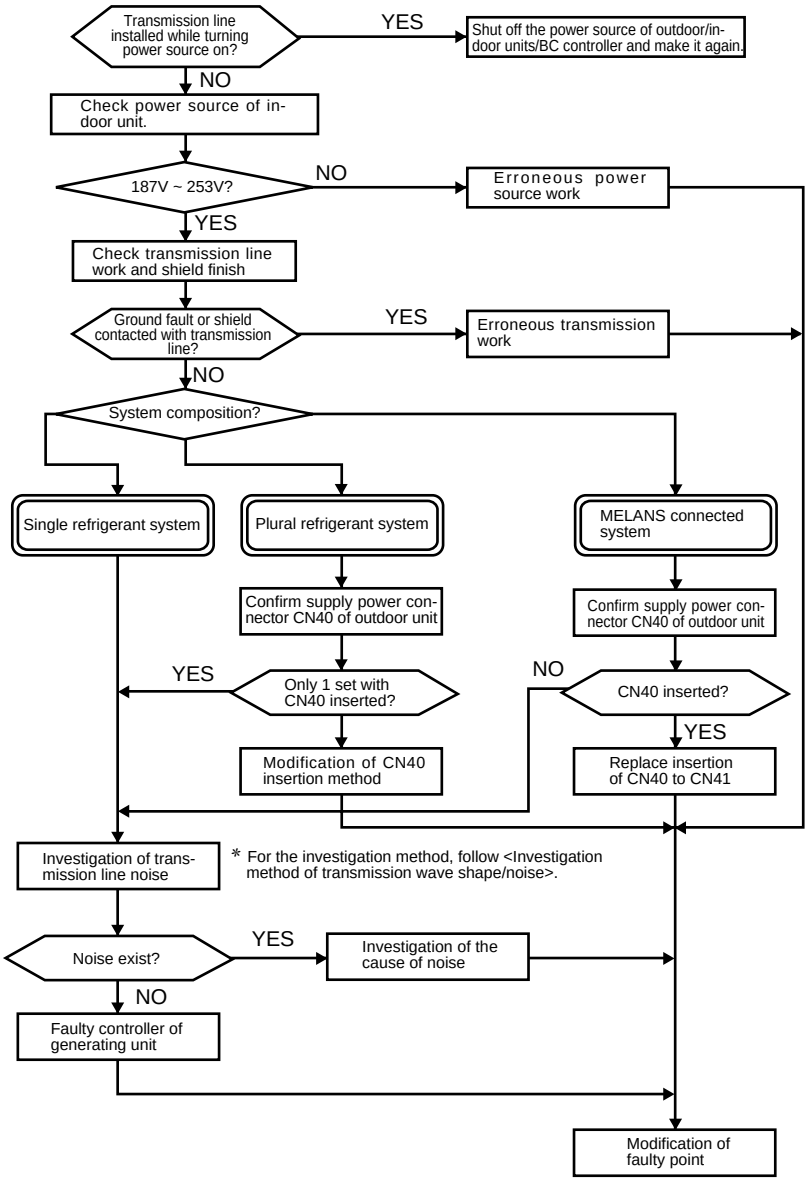
Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4240	Overcurrent protection	If IDC ≧ 103 A is detected continuously for 10 minutes during operation of the inverter after 5 or more seconds have passed since the inverter started.	1) Air passage Short Cycle	Is the unit's exhaust short cycling?
			2) The heat exchanger is clogged.	Clean the heat exchanger.
			3) Power Supply Voltage	If the power supply voltage is less than 198 V, it is outside specifications.
			4) External Air Temperature	If the external air temperature is over than 43°C it is outside the specifications.
			5) Capacity Setting Error	• Is the indoor unit capacity total appropriate? • Are the outdoor/indoor unit capacity settings appropriate?
			6) The THHS sensor is defective.	To judge failure of the THHS, go to the item for error code "5110."
			7) The solenoid valves (SV1, 2) are defective, or the solenoid valve drive circuit is defective.	To judge failure of the solenoid valve, go to "Individual Parts Failure Judgment Methods" for the "Solenoid Valve."
			8) The wiring is defective.	Check 1 connections, 2 contact at the connectors and 3 for broken wires in the following wiring. CNFAN1~MF1
			9) Fan motor (MF) operation is defective.	Go to "Treating Fan Motor Related Trouble."
			10) The inverter/compressor is defective.	Go to "Treating Inverter/Compressor Related Trouble."
			11) The circuit board is defective.	If none of the items in 1) to 10) is applicable, and if the trouble reappears even after the power is switched on again, replace the MAIN board (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely).
4250	Breaking of overcurrent	1) IPM/VDC trouble	1) Self protection by IPM break out, (over current, over heat, under control voltage)	Go to the item for error code 4230, 4240.
		2) If IDC ≧ 200 A is detected during inverter operation.	1) The power supply voltage is abnormal.	• Check if an instantaneous power failure or power failure, etc. has occurred. • Check if the voltage is the rated voltage value.
			2) The wiring is defective.	Check 1, the connections, 2, contact at the connectors, 3 tightening torque at screw tightened portions, 4, wiring polarities, 5, for broken wires, and 6, for grounding in the following wiring. * Check if the wiring polarities are as shown on the wiring diagram plate. * Check the coil resistances and insulation resistance of the compressor.
			3) The inverter/compressor is defective.	Go to "Treatment of Inverter/Compressor Releated Trouble."
		3) If VDC ≧ 350V or VDC ≦ 190V is detected during inverter operates.	(the same as error code 4220)	Go to the item for error code 4220.

Checking code		Meaning, detecting method	Cause	Checking method & Countermeasure
4260	Cooling fan trouble	If the heat sink temperature (THHS) ≧ 60°C for 10 minutes or longer just before the inverter starts.	1) Same as “4230.”	Same as “4230.”
5110	Radiator panel	If a heat sink temperature of (THHS) ≦ 40°C is detected just before starting of, and during operation of the inverter.	1) The THHS Sensor is defective.	Judge that the THHS has failed. Go to error code “5110.”
			2) Contact is faulty.	Check the contacts of CNTH on the INV board.
			3) The INV board is defective.	If none of the items in 1) to 2) is applicable, and if the trouble reappears even after the power is switched on again, replace the INV board (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely).
5301	IDC sensor/ circuit trouble	• If IDC ≧ 20 A is detected just before the inverter starts, or • If IDC ≦ 10 A is detected during inverter operation after 5 seconds has passed since the inverter started when the INV board’s SW1-1 is OFF.	1) Contact is faulty.	Check the contacts of CNCT on the INV board.
			2) The current sensor (DCCT) is connected with reverse polarity.	Check the DCCT polarity.
			3) An error was made in the SW1-1 setting.	• With SW1-1 OFF, is the inverter’s output wiring open? • With SW1-1 OFF, is a compressor which is not specified for this model connected to the inverter’s output?
			4) The INV board is defective. The current sensor (DCCT) is defective.	If none of the items in 1) to 3) is applicable, and if the trouble reappears even after the power is switched on again, replace the INV board and the DCCT (when replacing the circuit board, be sure to connect all the connectors, ground wires, etc. securely) by the following procedure. ① Replace the INV board only. If it recovers, the INV board is defective. ② If it does not recover, reinstall the INV board and replace the DCCT. If it recovers, the DCCT is defective. If it does not recover after ① and ② above, both the INV board and the DCCT are defective.

Checking code			Meaning, detecting method	Cause	Checking method & Countermeasure
5101	Thermal Sensor Error, Outdoor Unit	Discharge (TH1)	<Other than THHS> ① A short in the thermistor or an open circuit was sensed. The outdoor unit switches to the temporary stop mode with restarting after 3 minutes, then if the temperature detected by the thermistor just before restarting is in the normal range, restarting takes place. ② If a short or open circuit in the thermistor is detected just before restarting, error code "5101", "5102", "5105", "5106", "5107", "5108" or "5109" is displayed. ③ In the 3 minute restart mode, the abnormal stop delay LED is displayed. ④ The above short or open circuit is not detected for 10 minutes after the compressor starts, or for 3 minutes during defrosting or after recovery following defrosting. <THHS> If a heat sink (THHS) temperature of ≦ -40°C is detected just after the inverter starts or during inverter operation.	1) Thermistor	Check the thermistor's resistance.
5102		Low pressure saturation (TH2)		2) Lead wires are being pinched.	Check if the lead wires are pinched.
				3) Insulation is torn.	Check for tearing of the insulation.
				4) A connector pin is missing, or there is faulty contact.	Check if a pin is missing on the connector.
				5) A wire is disconnected.	Check if a wire is disconnected.
				6) The thermistor input circuit on the MAIN circuit board is faulty. (In the case of the THHS, replace the INV board.)	Check the temperature picked up by the sensor using the LED monitor. If the deviation from the actual temperature is great, replace the MAIN circuit board. (In the case of the THHS, replace the INV board.)
5105		Liquid pipe (TH5)		Short Circuit Detection / Open Circuit Detection	
5106		Ambient temperature (TH6)		TH1 240°C or higher (0.57 kΩ) / 15°C or lower (321 kΩ) TH2 70°C or higher (1.71 kΩ) / -40°C or lower (399 kΩ) TH3 70°C or higher (1.14 kΩ) / -40°C or lower (130 kΩ) TH4 70°C or higher (1.14 kΩ) / -40°C or lower (130 kΩ) TH5 110°C or higher (0.4 kΩ) / -40°C or lower (130 kΩ) TH6 110°C or higher (0.4 kΩ) / -40°C or lower (130 kΩ) TH7 70°C or higher (1.14 kΩ) / -40°C or lower (130 kΩ) TH8 110°C or higher (0.4 kΩ) / -40°C or lower (130 kΩ) THHS 100°C or higher (3.0 kΩ) / -40°C or lower (2.5 kΩ)	
5107		SC coil outlet (TH7)			
5108		SC coil bypass outlet (TH8)			
5110		Radiator panel (THHS)			
5201		Pressure sensor trouble	① When pressue sensor detects 1kg/cm² or less during operation, outdoor unit once stops with 3 minutes restarting mode, and restarts if the detected pressure of pressure sensor exceeds 1kg/cm² imediately before restarting. ② If the detected pressure of sensor is less than 1kg/cm² immediately before restarting, error stop is commenced displaying 5201. ③ Under 3 minutes restarting mode, LED displays intermittent fault check. ④ During 3 minutes after compressor start, defrosting and 3 minutes after defrosting operations, trouble detection is ignored.	1) Pressutre sensor trouble. 2) Inner pressure drop due to a leakage 3) Broken cover. 4) Coming off of pin at connector portion, poor contact. 5) Broken wire 6) Faulty thermistor input circuit of MAIN board.	See **Troubleshooting of pressure sensor.**

(2) Communication/system

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
6600	**Multiple address error** Transmission from units with the same address is detected. Note: The address/attribute shown on remote controller indica tes the controller which has detected error.	1) Two or more controllers of outdoor unit, indoor unit, remote controller, etc. have the same address. 2) In the case that signal has changed due to noise entered into the transmission signal.	At the genration of 6600 error, release the error by remote controller (with stop key) and start again. a) If the error occures again within 5 minutes → Search for the unit which has the same address with that of the source of the trouble. When the same address is found, turn off the power source of outdoor unit, and indoor unit for 5 minutes or more after modifying the address, and then turn on it again. b) When no trouble is generated even continuing operation over 5 minutes → The transmission wave shape/noise on the transmission line should be investigated in accordance with <Investigation method of transmission wave shape/noise>.
6602	**Transmission processor hardware error** Though transmission processor intends to transmit "0", "1" is displayed on transmission line. Note: The address/attribute shown on remote controller indicates the controller which has detected error.	1) At the collision of mutual transmission data generated during the wiring work or polarity change of the transmission line of indoor or outdoor unit while turning the power source on, the wave shape is changed and the error is detected. 2) 100V power source connection to indoor unit. 3) Ground fault of transmission line. 4) Insertion of power supply connector (CN40) of plural outdoor units at the grouping of plural refrigerant systems. 5) Insertion of power supply connector (CN40) of plural outdoor units in the connection system with MELANS. 6) Faulty controller of unit in trouble. 7) Change of transmission data due to the noise in transmission. 8) Connection system with plural refrigerant systems or MELANS for which voltage is not applied on the transmission line for central control.	

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
6602	**Transmission processor hardware error**	Checking method and processing 	
6603	**Transmission circuit bus-busy error** ①Collision of data transmission: Transmission can not be performed for 4~10 consecutive minutes due to collision of data transmission. ②Data can not be transmitted on transmission line due to noise for 4~10 consecutive minutes. Note: The address/attribute shown on remote controller indicates the controller which has detected error.	1) As the voltage of short frequency like noise is mixed in transmission line continuously, transmission processor can not transmit. 2) Faulty controller of generating unit.	a) Check transmission wave shape/noise on transmission line by following <Investigation method of transmission wave shape/noise>. → No noise indicates faulty controller of generating unit. → Noise if existed, check the noise.

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
6606	**Communications with transmission processor error** Communication trouble between apparatus processor and trans-mission processor. Note: The address/attribute shown on remote controller indicates the controller which has detected error.	1) Data is not properly transmitted due to casual errouneous operation of the generating controller. 2) Faulty generating controller.	Turn off power sources of indoor unit and outdoor unit. (When power sources are turned off separately, microcomputer is not reset and normal operations can not be restored.) → Controller trouble is the source of the trouble when the same trouble is observed again.

Checking code	Meaning, detecting method
6607	No ACK error — When no ACK signal is detected in 6 continuous times with 30 second interval by transmission side controller, the transmission side detects error. Note: The address/attribute shown on remote controller indicates the controller not providing the answer (ACK).

System composition	Generating unit address	Display of trouble	Detecting method	Cause	Checking method & countermeasure
(1) Single refrigerant system	① Outdoor unit (OC)	Remote controller (RC)	No reply (ACK) at IC transmission to OC	1) Poor contact of transmission line of OC or IC. 2) Damping of transmission line voltage/signal by acceptable range of transmission wiring exceeded. Farthest : Less than 200m Remote controller wiring : Less than 10m 3) Erroneous sizing of transmission line (Not within the range below). Wire diameter : 1.25mm^2 or more 4) Faulty control circuit board of OC	Shut down OC unit power source, and make it again. It will return to normal state at an accidental case. When normal state can not be recovered, check for the 1) ~ 4) of the cause.
	② Indoor unit (IC)	Remote controller (RC)	No reply (ACK) at RC transmission to IC	1) When IC unit address is changed or modified during operation. 2) Faulty or slipping off of transmission wiring of IC 3) Slipping off of IC unit connector (CN2M) 4) Faulty IC unit controller 5) Faulty remote controller	Shut down both OC and IC power sources simultaneously for 5 minutes or more, and make them again. It will return to normal state at an accidental case. When normal state can not be recovered, check for the 1) ~ 5) of the cause.
	③ Remote controller (RC)	Remote controller (RC)	No reply (ACK) at IC transmission to RC	1) Faulty transmission wiring at IC unit side 2) Faulty transmission wiring of RC 3) When remote controller address is changed or modified during operation 4) Faulty remote controller	Shut down OC power sources for 5 minutes or more, and make it again. It will return to normal state at an accidental case. When normal state can not be recovered, check for the 1) ~ 4) of the cause.

Checking code	Meaning, detecting method
6607 (continued)	No ACK error — When no ACK signal is detected in 6 continuous times with 30 second interval by transmission side controller, the transmission side detects error. Note: The address/attribute shown on remote controller indicates the controller not providing the answer (ACK).

System composition	Generating unit address	Display of trouble	Detecting method	Cause	Checking method & countermeasure
(2) Group operation system using plural refrigerants	① Outdoor unit (OC)	Remote controller (RC)	No reply (ACK) at IC transmission to OC	As same that for single refrigerant system	Same as measure for single refrigerant system
	② Indoor unit (IC)	Remote controller (RC)	No reply (ACK) at RC transmission to IC	1) Cause of 1) ~ 5) of "Cause for single refrigerant system" 2) Slipping off or short circuit of transmission line of OC terminal block for centralized control (TB7) 3) Shut down of OC unit power source of one refrigerant system 4) Neglecting insertion of OC unit power supply connector (CN40) 5) Inserting more than 2 sets of power supply connector (CN40) for centralized control use. For generation after normal operation conducted once, the following causes can be considered. • Total capacity error (7100) • Capacity code setting error (7101) • Connecting set number error (7102) • Address setting error (7105)	a) Shut down the power source of both IC and OC for over 5 minutes simultaneously, and make them again. Normal state will be returned incase of accidental trouble. If it does not return to normal, follow b). b) Check for 1) ~ 5) of causes. If cause is found, remedy it. If no cause is found, follow c). c) Check other remote controller or OC unit LED for troubleshooting for trouble. Trouble → Modify the trouble according to the content of check code. No trouble → Faulty indoor controller
	③ Remote controller (RC)	Remote controller (RC)	No reply (ACK) at IC transmission to RC	1) Cause of 1) ~ 3) of "Cause for single refrigerant system" 2) Slipping off or short circuit of transmission line of OC terminal block for centralized control (TB7) 3) Shut down of OC unit power source of one refrigerant system 4) Neglecting insertion of OC unit power supply connector (CN40) 5) Inserting more than 2 sets of power supply connector(CN40) for centralized control use At generation after normal operation conducted once, the following causes can be considered. • Total capacity error (7100) • Capacity code setting error (7101) • Connecting set number error (7102) • Address setting error (7105)	a) Shut down the power source of OC for over 5 minute, and make it again. Normal state will be returned in case of accidental trouble. If it does not return to normal, follow b). b) Check for 1) ~ 5) of causes. If cause is found, remedy it. If no cause is found, follow c). c) Same as that of c) for IC unit When normal state can not be obtained, check 1) ~ 5) of causes.

Checking code	Meaning, detecting method
6607 (continued)	No ACK error — When no ACK signal is detected in 6 continuous times with 30 second interval by transmission side controller, the transmission side detects error. Note: The address/attribute shown on remote controller indicates the controller not providing the answer (ACK).

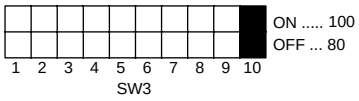
System composition	Generating unit address	Display of trouble	Detecting method	Cause	Checking method & countermeasure
(3) Connecting system with system controller (MELANS)	① Outdoor unit (OC)	Remote controller (RC)	No reply (ACK) at IC transmission to OC	As same that for single refrigerant system	Same countermeasure as that for single refrigerant system
	② Indoor unit (IC)	Remote controller (RC)	No reply (ACK) at transmission of SC to IC	Trouble of partial IC units: 1) Same cause as that for single refrigerant system	→ Same countermeasure as that for single refrigerant system
				Trouble of all ICs in one refrigerant system: 1) Cause of total capacity error (7100) 2) Cause of capacity code setting error (7101) 3) Cause of connecting number error (7102) 4) Cause of address setting error (7105) 5) Slipping off or short circuit of transmission line of OC unit terminal block for central control (TB7) 6) Power source shut down of OC unit 7) Trouble of OC unit electrical system	Confirm OC trouble diagnosis LED →At trouble generation, check for the content according to check code. →At no trouble, follow b). Check the content of 5)~7) shown left.
				Trouble of all ICs: 1) Cause of 1) ~ 7) of (b) 2) Insertion of power supply connector (CN40) into OC unit transmission line for centralized control 3) Slipping off or power source shut down of power supply unit for transmission line 4) Faulty system controller (MELANS)	Confirm voltage of transmission line for centralized control • More than 20V →Confirm 1) 2) left. • Less than 20V →Confirm 3) left.
	③ Remote controller (RC)	Remote controller (RC)	No reply (ACK) at transmission of IC to RC	Same cause as that for plural refrigerant system	Same countermeasure as that for plural refrigerant system
			No reply (ACK) at transmission of MELANS to RC	Trouble of partial IC units: 1) Same cause of that for single refrigerant system	→ Same countermeasure as that for single refrigerant system
				Trouble of all ICs in one refrigerant system: 1) Error detected by OC unit Total capacity error (7100) Capacity code setting error (7101) Connecting number error (7102) Address setting error (7105) 2) Slipping off or short circuit of transmission line of OC unit terminal block for central control (TB7) 3) Power source shut down of OC unit 4) Trouble of OC unit electrical system	Confirm OC trouble diagnosis LED → At trouble generation, check for the content according to check code. → At no trouble, follow (b). Check the content of 2)~4) shown left.
				Trouble of all ICs: 1) Cause of 1) ~ 7) of (b) 2) Insertion of power supply connector (CN40) into OC unit transmission line for centralized control 3) Slipping off or power shutdown of power supply unit for transmission line 4) Faulty MELANS	Check the causes of 1) ~ 4) left.

Checking code	Meaning, detecting method
6607 (continued)	No ACK error — When no ACK signal is detected in 6 continuous times with 30 second interval by transmission side controller, the transmission side detects error. Note: The address/attribute shown on remote controller indicates the controller not providing the answer (ACK).

System composition	Generating unit address	Display of trouble	Detecting method	Cause	Checking method & countermeasure
(3) Connecting system with system controller (MELANS)	④ System controller (SC)	Remote controller (RC)	No reply (ACK) at transmission of IC to SC	Trouble of partial remote controller: 1) Faulty wiring of RC transmission line 2) Slipping off or poor contact of RC transmission connector. 3) Faulty RC	Check 1) ~ 3) left.
				Trouble of all ICs in one refrigerant system 1) Error detected by OC unit Total capacity error (7100) Capacity code setting error (7101) Connecting number error (7102) Address setting error (7105) 2) Slipping off or short circuit of transmission line of OC unit terminal block for central control (TB7). 3) Power source shut down of OC unit 4) Trouble of OC unit electrical system	a) Confirm OC trouble diagnosis LED →At trouble generation, check for the content according to check code. →At no trouble, follow b). b) Check the content of 2) ~ 4) shown left.
				Trouble of all RC: 1) Cause of 1) ~ 7) of (b) 2) Inserting supply power connector (CN40) to OC transmission line for centralized control 3) Slipping off or power shutdown of power supply unit for transmission line 4) Faulty MELANS	Check the causes 1)~4) left.
No relation with system	Address which should not be exist-ed	–	–	IC unit is keeping the memory of the original group setting with RC although the RC address was changed later. The same symptom will appear for the registration with SC.	As some IC units are keeping the memory of the address not existing, delete the information. Employ one of the deleting method among two below. 1) Deletion by remote controller Delete unnecessary information by the manual setting function of remote controller. 2) Deletion by connecting information deleting switch of OC unit Be careful that the use of this method will delete all the group information set with RC and all the interlocking information of IC unit. ① Shut down OC unit power source, and wait for 5 minutes. ② Turn on the dip switch SW2-2 provided on OC unit control circuit board. ③ Make OC unit power source, and wait for 5 minutes. ④ Shut down OC unit power source, and wait for 5 minutes. ⑤ Turn off the dip switch SW2-2 provided on OC unit control circuit board. ⑥ Make OC unit power source.

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
6608	**No response error** Though acknowledgement of receipt (ACK) is received after transmission, no response command is returned. Detected as error by transmission side when the same symptom is re-peated 10 times with an interval of 3 seconds Note: The address/attribute shown on remote controller indicates the controller which has detected error.	1) At the collision of mutual transmission data when transmission wiring is modified or the polarity is changed while turning the power source on, the wave shape changes detecting error. 2) Repeating of transmission error due to noise. 3) Damping of transmission line voltage/signal due to exceeding of the acceptable range for transmission wiring. • Farthest Less than 200m • RC wiring Less than 12m 4) Damping of transmission voltage/signal due to improper type of trans-mission line. • Wire size : More than 1.25mm^2	a) Generation at test run Turn off the power sources of OC unit, IC unit and Fresh Master for more than 5 minutes simultaneously, and make them again. → Returning to normal state means the trouble detection due to transmission line work while powering. → If generated again, follow b). b) Check 3) and 4) of the causes left. → If cause is found, remedy it. → If cause is not found, follow c). c) Investigate the transmission wave shape/noise on transmission line according to <Investigation method of transmission wave shape/noise>. Much possibility if 6602 is generated.

(3) System error

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
7100	**Total capacity error** Total capacity of indoor units in the same refrigerant system exceeds limitations. Trouble source: Outdoor unit	1) Total capacity of indoor units in the same refrigerant system exceeds the following: Model: PUHY-80 — Total capacity: 104 Model: PUHY-100 — Total capacity: 130	a) Check for the model total (capacity cord total) of indoor units connected. b) Check whether indoor unit capacity code (SW2) is wrongly set. For erroneous switch setting, modify it, turn off power source of outdoor unit, and indoor unit simultaneously for 5 minutes or more to modify the switch for setting the model name (capacity coad).
		2) Erroneous setting of OC model selector switch (SW3-10)  	Check for the model selector switch (Dip switches SW3-10 on outdoor unit control circuit) of OC.
7101	**Capacity code error** Error display at erroneous connection of Indoor unit of which model name can not be connected Trouble source : Outdoor unit Indoor unit	1) The Indoor unit model name (model code) connected is not connectable. Connectable range..... 08~48 2) Erroneous setting of the switch (SW2) for setting of model name of Indoor unit connected.	a) Check for the model name of the Indoor unit connected. b) Check for the switch (SW2 if indoor controller for setting of Indoor unit model name of generating address. When it is not agreed to the model name, modify the capacity code while shutting off the power source of Indoor unit. * The capacity of Indoor unit can be confirmed by the self-diagnosios function (SW1 operation) of Indoor unit.
7102	**Connected unit count over** Number of units connected in the same refrigerant system exceeds limitations. Trouble source: Outdoor unit	1) Number of unit connected to terminal block (TB3) for outdoor/indoor transmission line exceeds limitations given be-lows: ① Total of Indoor unit — Limitation: 1~13 (80) 1~16 (100) ② Total of Indoor unit & RC — Limitation: 1~35	a) Check whether the connection of units to the terminal block for indoor/outdoor transmission wiring (TB3) of outdoor unit is not exceeding the limitation. (See ① ~ ② left.) b) Check for 2), 3), 4), left. c) Check for the connection of transmission wiring to the terminal block for centralized control is erroneously connected to the indoor/outdoor transmission wiring terminal block (TB3).

Checking code	Meaning, detecting method	Cause	Checking method & Countermeasure
7102	**Connected unit count over**	2) The Outdoor unit address is being set to 51~100 under automatic address mode (Remote controller displays “HO”). 3) Slipping off of transmission wiring at Outdoor unit. 4) Short circuit of transmission line in case of 3) & 4), remote controller displays “HO”.	a) Check for the model total (capacity code total) of indoor units connected.
7105	**Address setting error** • Erroneous setting of Outdoor unit address Trouble source : Outdoor unit	1) Setting error of Outdoor unit address The address of Outdoor unit is not being set to 51~100.	Check that the address of Outdoor unit is being set to 51~100. Reset the address if it stays out of the range, while shutting the power source off.
7111	**Remote control sensor error** Error not providing the temperature designed to remote controller sensor. Trouble source : Indoor unit	1) In case when the old type remote controller for M-NET is used and the remote controller sensor is designed on indoor unit. (SW1-1 turned ON)	a) Replace the old remote controller by the new remote controller.

[3] LED Monitor Display

E: E2 Contents stored in the E2PROM; M: Monitored by the IC through communications; E*: Stored in service memory.

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
0	0000000000	Relay Output Display 1 (Lights up to display)	COMP Operating	Crankcase Heater	21S4*	SV1	SV2			Lights for Normal Operation	LD8 is a relay output indicator which lights u at all times when the microcomputer's power is ON. When sending of a monitoring request to IC/BC is terminated, if there is no error, "- - - -" is displayed. E* *only for PUHY
		Check Display 1 OC Error	0 ~ 9999 Address and error code reversed								
1	1000000000	Relay Output Display 2							SSR		E*
2	0100000000	Check Display 2 (Including the IC)	0 ~ 9999 Address and error code reversed								If there is no error, "- - - -" is displayed. E*
3	1100000000										
4	0010000000										
5	1010000000										
6	0110000000										E*
7	1110000000	Outdoor Unit Operation Display		Packet being sent	3 minutes, restart	Compressor operating	Preliminary Error	Error			E*
8	0001000000	Indoor Unit Check	Unit No. 1	Unit No. 2	Unit No. 3	Unit No. 4	Unit No. 5	Unit No. 6	Unit No. 7	Unit No. 8	Lights up if an abnormal stop has occurred in the IC. The indicator for Unit No. 1 goes off when error reset is carried out from the smallest address. M
9	1001000000		Unit No. 9	Unit No. 10	Unit No. 11	Unit No. 12	Unit No. 13	Unit No.14	Unit No. 15	Unit No. 16	
10	0101000000	Indoor Unit Operation Mode	Unit No. 1	Unit No. 2	Unit No. 3	Unit No. 4	Unit No. 5	Unit No. 6	Unit No. 7	Unit No. 8	Lights up during cooling. Blinks during heating. Goes off during stop and blower operation. M
11	1101000000		Unit No. 9	Unit No. 10	Unit No. 11	Unit No. 12	Unit No. 13	Unit No.14	Unit No. 15	Unit No. 16	
12	0011000000	Indoor Unit Thermostat	Unit No. 1	Unit No. 2	Unit No. 3	Unit No. 4	Unit No. 5	Unit No. 6	Unit No. 7	Unit No. 8	Lights up when thermostat is ON. Goes off when thermostat is OFF. M
13	1011000000		Unit No. 9	Unit No. 10	Unit No. 11	Unit No. 12	Unit No. 13	Unit No.14	Unit No. 15	Unit No. 16	
14	0111000000										
15	1111000000	Outdoor Unit Operation Mode	Permissible Stop	Standby	Defrosting	Cooling		Heating			E*
16	0000100000	Outdoor Unit Control Mode	Cooling Refrigerant Recovery		Heating Refrigerant Recovery		Cooling High Oil Recovery	Cooling Low Oil Recovery	Heating High Oil Recovery	Heating Low Oil Recovery	
17	1000100000	Error Delay in Outdoor Unit	High Pressure Error 1, 2		Outlet Temperature Error	Overcurrent Protection	Heat Sink Thermostat Operating	Overcurrent Break	INV Error	Refrigerant Overcharge	The flag corresponding to the item where there is an error delay lights up. E*
18	0100100000		Suction Pressure Error	Configuration Detection Error		Reverse Phase, Open Phase Error					
19	1100100000		TH1 Error	TH2 Error			TH5 Error	TH6 Error	HPS Error	THHS Error	
20	0010100000		TH7 Error	TH8 Error							

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
21	1010100000	Outdoor Unit Preliminary Error History	High Pressure Error 1, 2	Low Pressure Error	Outlet Tempera-ture Error	Overcur-rent Protection	Heat Sink Thermostat Operation	Overcur-rent Break		Refrigerant Over-charge	Lights up if an error delay has occurred between the time the power was turned on and the present time. To turn the indicators off, switch the power OFF briefly. E*
22	0110100000		Suction Pressure Error	Configuration Detection Error		Reverse Phase, Open Phase Error					
23	1110100000		TH1 Error	TH2 Error			TH5 Error	TH6 Error	HPS Error	THHS Error	
24	0001100000		TH7 Error	TH8 Error							
25	1001100000	Error History 1	0 ~ 9999								The error and error delay code are displayed. If the address and error code are shown in reverse, or there is no error, "- - - -" is displayed. E
26	0101100000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								If there is no error, "- - - -" is displayed. E
27	1101100000	Error History 2	0 ~ 9999								E
28	0011100000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
29	1011100000	Error History 3	0 ~ 9999								
30	0111100000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
31	1111100000	Error History 4	0 ~ 9999								
32	0000010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
33	1000010000	Error History 5	0 ~ 9999								
34	0100010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
35	1100010000	Error History 6	0 ~ 9999								
36	0010010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
37	1010010000	Error History 7	0 ~ 9999								
38	0110010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
39	1110010000	Error History 8	0 ~ 9999								
40	0001010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
41	1001010000	Error History 9	0 ~ 9999								
42	0101010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
43	1101010000	Error History 10	0 ~ 9999								
44	0011010000	Inverter Error Detail	Inverter Error Detail (1 ~ 9)								
45	1011010000	Type of Prelimi-nary Inverter Error (Details of the inverter error in No. 17)	0 ~ 9999								If there is no error, "- - - - " is always overwritten. E*
46	0111010000	TH1 Data	-99.9 ~ 999.9								E*
47	1111010000	TH2 Data	↑								No. 52 THHS data are monitored by the inverter microcomputer.
48	0000110000										
49	1000110000										
50	0100110000	TH5 Data	-99.9 ~ 999.9								
51	1100110000	TH6 Data	↑								

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
52	0010110000	THHS Data	-99.9 ~ 999.9								E*
53	1010110000	HPS Data	↑								
54	0110110000	TH7 Data	↑								
55	1110110000	TH8 Data	↑								
56	0001110000										
57	1001110000										
58	0101110000										
59	1101110000	Accumulator Level	0~9 (“AL=” is also displayed)								
60	00111100	Change in Hz AK	ΔHz –	ΔHz 0	ΔHz +	–	–	ΔAK –	ΔAK 0	ΔAK +	
61	10111100	Difference from target TC	Low -3 deg. or less	Low -3 ~ -2 deg.	Low -2 ~ -1 deg.	Stable region		High 1~2 deg.	High 2~3 deg.	High 3 deg. or more	
62	01111100	Difference from target ET	Low -3 deg. or less	Low -3 ~ -2 deg.	Low -2 ~ -1 deg.	Stable region		High 1~2 deg.	High 2~3 deg.	High 3 deg. or more	
63	11111100	Target TC	-99.9 ~ 999.9								
64	00000010	Target ET	↑								
65	10000010	Temporary requency	0 ~ 9999								
66	01000010	Compressor output frequency	↑								Actual frequency output from inverter
67	11000010	AK	↑								
68	00100010	SLEV	↑								
69	10100010	LEV1	↑								
70	01100010	Fan controller output value	0000 ~ 9999								Display fan controller output value used for control.
71	11100010	DC buss current	-99.9 ~ 999.9								
72	00010010										
73	10010010	OC address	0000 ~ 9999								
74	01010010	IC1 address	↑								
75	11010010	IC2 address	↑								
76	00110010	IC3 address	↑								
77	10110010	IC4 address	↑								
78	01110010	IC5 address	↑								
79	11110010	IC6 address	↑								
80	00001010	IC7 address	↑								
81	10001010	IC8 address	↑								
82	01001010	IC9 address	↑								
83	11001010	IC10 address	↑								
84	00101010	IC11 address	↑								
85	10101010	IC12 address	↑								
86	01101010	IC13 address	0000 ~ 9999								

When there is an error stop with No92-111, the data on error stops or the data immediately before the error postponement stop, which is stored in service memory, are displayed.

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
87	11101010	IC14 address	↑								
88	00011010	IC15 address	0000 ~ 9999								
89	10011010	IC16 address	↑								
90	01011010	Compressor operat-ion hour upper 4 digits	↑								
91	11011010	Lower 4 digits	↑								
92	00111010	OC operation mode	Permitted mode stop	Standby	Defrost	Cooling		Heating			No.92-111 display the data immediately before error stop or error intermittent foult stop.
93	10111010	OC operation mode	Cooling Refrigerant recovery		Heating Refrigerant recovery		Cooling High oil recovery	Cooling Low oil recovery	Heating High oil recovery	Heating Low oil recovery	
94	01111010	Relay output display 1 Lighting display	Com-pressor operation	52C	21S4	SV1		SV4			
95	11111010	TH1 data	-99.9 ~ 999.9								
96	00000110	TH2 data	↑								
97	10000110										
98	01000110										
99	11000110	TH5 data	-99.9 ~ 999.9								
100	00100110	TH6 data	↑								
101	10100110	Pressure sensor data	↑								
102	01100110	THHS data	↑								
103	11100110	TH7 datata	↑								
104	00010110	TH8 data	↑								
105	10010110										
106	01010110	Compressor output frequency	0 ~ 9999								
107	11010110	AK	↑								
108	00110110	SLEV	↑								
109	10110110	LEV1	↑								
110	01110110	Compressor operating current	-99.9 ~ 999.9								
111	11110110	OC operation display		In forcible powering	3-minute restart	Compres-sor Operating	Intermit-tent fault check	Trouble			
112	00001110	IC1 inlet temperature	-99.9 ~ 999.9								
113	10001110	IC2 inlet temperature	↑								
114	01001110	IC3 inlet temperature	↑								
115	11001110	IC4 inlet temperature	↑								
116	00101110	IC5 inlet temperature	↑								

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
117	10101110	IC6 inlet temperature	-99.9 ~ 999.9								
118	01101110	IC7 inlet temperature	↑								
119	11101110	IC8 inlet temperature	↑								
120	00011110	IC9 inlet temperature	↑								
121	10011110	IC10 inlet temperature	↑								
122	01011110	IC11 inlet temperature	↑								
123	11011110	IC12 inlet temperature.	↑								
124	00111110	IC13 inlet temperature	↑								
125	10111110	IC14 inlet temperature	↑								
126	01111110	IC15 inlet temperature	↑								
127	11111110	IC16 inlet temperature	↑								
128	00000001	IC1 liquid piping temp.	↑								
129	10000001	IC2 liquid piping temp.	↑								
130	01000001	IC3 liquid piping temp.	↑								
131	11000001	IC4 liquid piping temp.	↑								
132	00100001	IC5 liquid piping temp.	↑								
133	10100001	IC6 liquid piping temp.	↑								
134	01100001	IC7 liquid piping temp.	↑								
135	11100001	IC8 liquid piping temp.	↑								
136	00010001	IC9 liquid piping temp.	↑								
137	10010001	IC10 liquid piping temp.	↑								
138	01010001	IC11 liquid piping temp.	↑								
139	11010001	IC12 liquid piping temp.	↑								
140	00110001	IC13 liquid pipe temp.	↑								
141	10110001	IC14 liquid piping temp.	↑								
142	01110001	IC15 liquid piping temp.	↑								
143	11110001	IC16 liquid piping temp.	↑								
144	00001001	IC1 gas piping temp.	↑								
145	10001001	IC2 gas piping temp.	↑								
146	01001001	IC3 gas piping temp.	↑								
147	11001001	IC4 gas piping temp.	↑								
148	00101001	IC5 gas piping temp.	↑								
149	10101001	IC6 gas piping temp.	↑								
150	01101001	IC7 gas piping temp.	↑								
151	11101001	IC8 gas piping temp.	↑								
152	00011001	IC9 gas piping temp.	↑								
153	10011001	IC10 gas piping temp.	↑								
154	01011001	IC11 gas piping temp.	↑								

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
155	11011001	IC12 gas piping temp.	-99.9 ~ 999.9								
156	00111001	IC13 gas piping temp.	↑								
157	10111001	IC14 gas piping temp.	↑								
158	01111001	IC15 gas piping temp.	↑								
159	11111001	IC16 gas piping temp.	↑								
160	00000101	IC1SH	↑								
161	10000101	IC2SH	↑								
162	01000101	IC3SH	↑								
163	11000101	IC4SH	↑								
164	00100101	IC5SH	↑								
165	10100101	IC6SH	↑								
166	01100101	IC7SH	↑								
167	11100101	IC8SH	↑								
168	00010101	IC9SH	↑								
169	10010101	IC10SH	↑								
170	01010101	IC11SH	↑								
171	11010101	IC12SH	↑								
172	00110101	IC13SH	↑								
173	10110101	IC14SH	↑								
174	01110101	IC15SH	↑								
175	11110101	IC16SH	↑								
176	00001101	IC1SC	↑								
177	10001101	IC2SC	↑								
178	01001101	IC3SC	↑								
179	11001101	IC4SC	↑								
180	00101101	IC5SC	↑								
181	10101101	IC6SC	↑								
182	01101101	IC7SC	↑								
183	11101101	IC8SC	↑								
184	00011101	IC9SC	↑								
185	10011101	IC10SC	↑								
186	01011101	IC11SC	↑								
187	11011101	IC12SC	↑								
188	00111101	IC13SC	↑								
189	10111101	IC14SC	↑								
190	01111101	IC15SC	↑								
191	11111101	IC16SC	↑								
192	00000011	IC1 LEV Opening	↑								
193	10000011	IC2 LEV Opening	↑								

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
194	01000011	IC3 LEV Opening	-99.9 ~ 999.9								
195	11000011	IC4 LEV Opening	↑								
196	00100011	IC5 LEV Opening	↑								
197	10100011	IC6 LEV Opening	↑								
198	01100011	IC7 LEV Opening	↑								
199	11100011	IC8 LEV Opening	↑								
200	00010011	IC9 LEV Opening	↑								
201	10010011	IC10 LEV Opening	↑								
202	01010011	IC11 LEV Opening	↑								
203	11010011	IC12 LEV Opening	↑								
204	00110011	IC13 LEV Opening	↑								
205	10110011	IC14 LEV Opening Angle	↑								
206	01110011	IC15 LEV Opening	↑								
207	11110011	IC16 LEV Opening	↑								
208	00001011	IC1 operation mode	0: Stopped 1: Fan 2: Cooling 3: Heating 4: Dry								
209	10001011	IC2 operation mode									
210	01001011	IC3 operation mode									
211	11001011	IC4 operation mode									
212	00101011	IC5 operation mode									
213	10101011	IC6 operation mode									
214	01101011	IC7 operation mode									
215	11101011	IC8 operation mode									
216	00011011	IC9 operation mode									
217	10011011	IC10 operation mode									
218	01011011	IC11 operation mode									
219	11011011	IC12 operation mode									
220	00111011	IC13 operation mode									
221	10111011	IC14 operation mode									
222	01111011	IC15 operation mode									
223	11111011	IC16 operation mode									
224	00000111	IC1 capacity code	0000 ~ 9999								
225	10000111	IC2 capacity code	↑								
226	01000111	IC3 capacity code	↑								
227	11000111	IC4 capacity code	↑								
228	00100111	IC5 capacity code	↑								
229	10100111	IC6 capacity code	↑								
230	01100111	IC7 capacity code	↑								
231	11100111	IC8 capacity code	↑								

No	SW1	Item	Display								Remarks
	12345678910		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	
232	00010111	IC9 capacity code	0000 ~ 9999								
233	10010111	IC10 capacity code	↑								
234	01010111	IC11 capacity code	↑								
235	11010111	IC12 capacity code	↑								
236	00110111	IC13 capacity code	↑								
237	10110111	IC14 capacity code	↑								
238	01110111	IC15 capacity code	↑								
239	11110111	IC16 capacity code	↑								
240	00001111	IC1 filter	↑								
241	10001111	IC2 filter	-99.9 ~ 999.9								
242	01001111	IC3 filter	↑								
243	11001111	IC4 filter	↑								
244	00101111	IC5 filter	↑								
245	10101111	IC6 filter	↑								
246	01101111	IC7 filter	↑								
247	11101111	IC8 filter	↑								
248	00011111	IC9 filter	↑								
249	10011111	IC10 filter	↑								
250	01011111	IC11 filter	↑								
251	11011111	IC12 filter	↑								
252	00111111	IC13 filter	↑								
253	10111111	IC14 filter	↑								
254	01111111	IC15 filter	↑								
255	11111111	IC16 filter	↑								

Service Handbook PUHY-80TMU-A, 100TMU-A

MITSUBISHI ELECTRIC CORPORATION

Issued in March 2004

New publication effective March 2004.
Specifications subject to change without notice.

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